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ILG

THE ILG-BOOK OF VITALIZED VENTILATION

COMPILED FOR ARCHITECTS, ENGINEERS, CONTRACTORS

ILG

VITALIZED VENTILATION

AND AIR CONDITIONING

AIR CHANGE... NOT JUST AIR MOVEMENT!

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THE ILG-BOOK OF

VITALIZED VENTILATION

compiled for

ARCHITECTS, ENGINEERS, CONTRACTORS

PRICE $1.00

combining the results of nearly forty years' experience of the

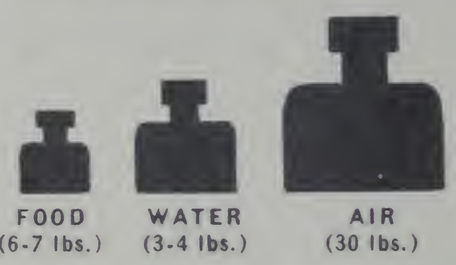
ILG ELECTRIC VENTILATING CO.

CHICAGO, ILLINOIS

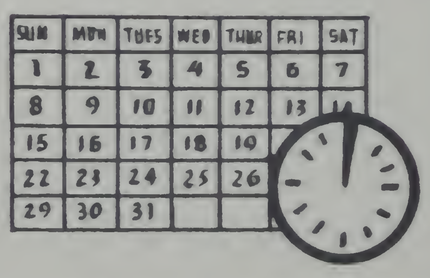
WHAT IS "VITALIZED" VENTILATION?

The air you breathe should be as pure as the water you drink!

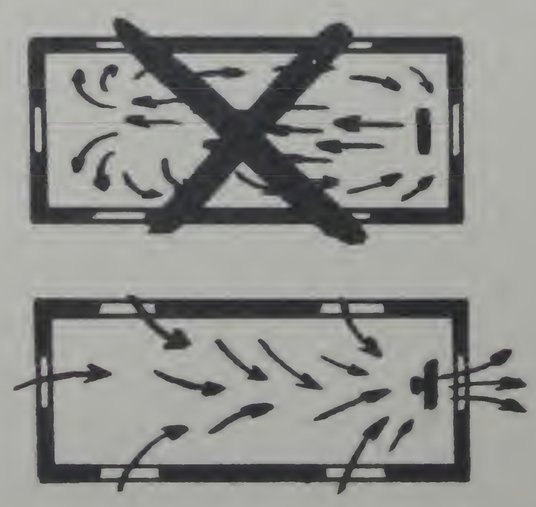
You breathe 400 cubic inches of air every minute.



Each day you consume 6 to 7 pounds of food, 3 to 4 pounds of water and 30 pounds of air. (*An Air Conditioning Primer* by Wm. Hull Stangle)



You can live weeks without food, days without water, but only a few minutes without air!



AIR CHANGE...NOT JUST AIR MOVEMENT!

Instead of fans that merely stir up air that's already in a building, all ILG apparatus is built on the "exhaust" principle—complete and frequent air *change*. In buildings ventilated by ILG, stale inside air is forcibly ejected, while fresh air is sucked-in through normal building openings—causing buildings to actually *"breathe"*.

TABLE OF CONTENTS

AIR CHANGE REQUIREMENTS

It will be noted in reading the following pages, that various air changes are suggested for different types of spaces. The way to figure air changes is very simple.

If a five-minute air change is desired, or, in other words, you wish to change the air in a room every five minutes, merely figure up the cubical contents of the room by multiplying the length, width, and height. After getting the cubical contents, divide the same by five, which gives you the amount of air a fan should handle.

As an example: Take a room 100′ long, 25′ wide, with a 14′ ceiling. By multiplying 100 x 25 x 14, it is found that the room contains 35,000 cubic feet of air space. Dividing this by 5, equals 7,000. This is the amount of air, namely 7,000 cubic feet, which a fan should handle per minute to create a five-minute air change in the room.

If installations are made according to the following suggestions and illustrations, correct and satisfactory ventilation will be obtained at a very *reasonable* cost.

AIR CHANGE TABLE

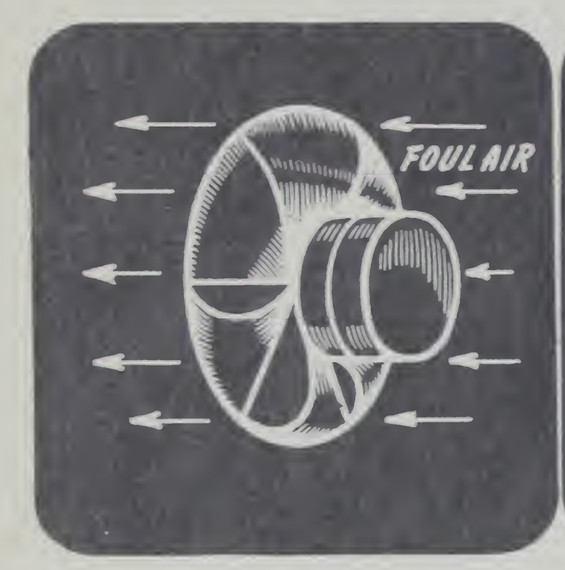
CLASS OF BUILDING	*Recommended Air Change for Sensible Ventilation and Cooling	Recommended Air Change for Good Ventilation
Offices	2 minutes	5 minutes
Stores	2 minutes	5 minutes
Restaurant and Hotel Kitchens	1 minute	2 minutes
Factories (General Ventilation)	3 minutes	6 minutes
Garages	3 minutes	6 minutes
Halls (Meeting)	2 minutes	5 minutes
Churches	2 minutes	5 minutes
Theaters	2 minutes	5 minutes
Laundries	1 minute	3 minutes
Home Kitchens	1 minute	2 minutes
Attic Cooling and Ventilation	2 minutes on floor below attic space	— — — —
Farm Barns	— — — —	60 CFM per cow 30 CFM per horse
Poultry Houses	— — — —	½ to 1 CFM per chicken

*Definition of Sensible Ventilation and Cooling: Exhaust ventilation with a rate of air change high enough to provide a combination of good ventilation, refreshing air movement, and effective heat exhaust.

THE *Inside Story* OF VENTILATING FANS

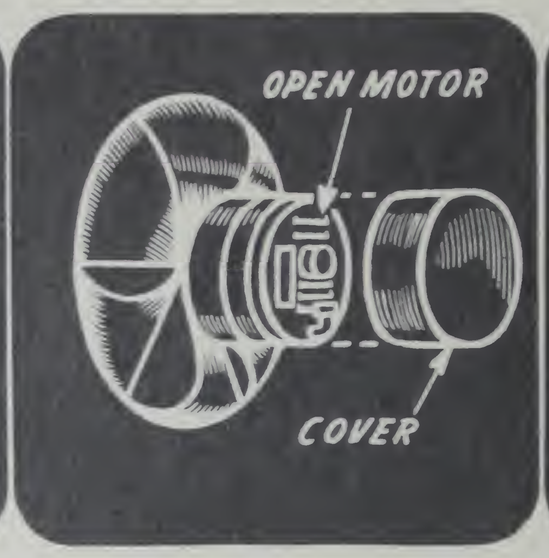
1 Propeller fan, in simplest terms, consists of motor and fan wheel. Low cost (no ducts), effective method of exhausting bad air, heat, steam, dust, vapors.

2 Direct connection of motor and wheel avoids noisy operation, misalignment, wasteful friction losses usually present when belts, gears, pulleys, or couplings are used.

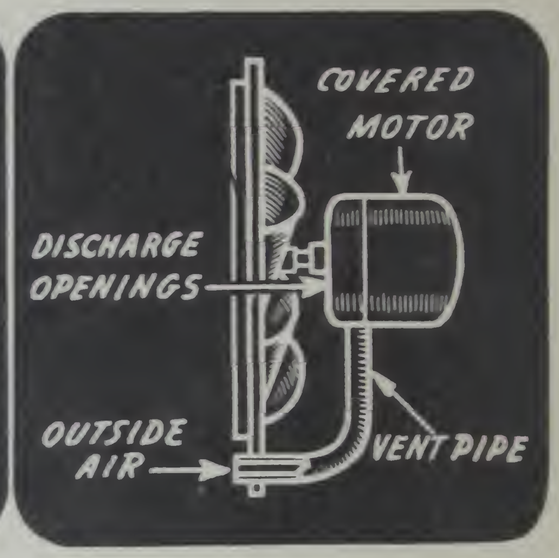


3 Motor comes into contact with impurities being exhausted. Grease, dust, steam, moisture, smoke, gases, or fumes in exhaust air deposit on motor.

4 If motor is *open,* deposits "gum-up" operation, interrupt service, shorten its life. If motor is *enclosed,* deposits form a blanket of insulation . . . motor "runs hot."

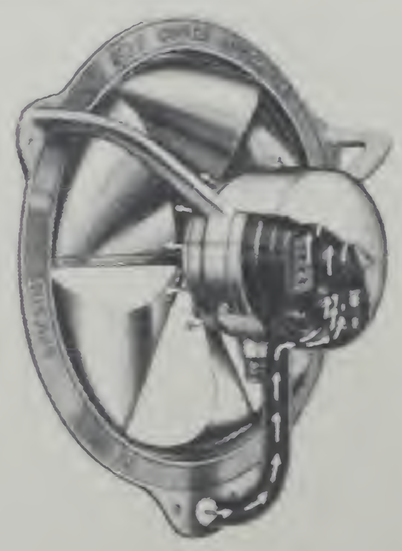


5 Recognizing this situation . . . Ilg did something about it . . . 35 years ago! As first step, Ilg built its own motor, specially designed for fan operation . . . then *covered* it.



6 Vent pipe attached to motor cover has entrance to vent OUTSIDE of building, OUTSIDE of exhaust air stream. Air forced through fan blades creates suction at openings in FRONT of motor.

7 Suction at front motor openings draws air up through vent pipe, where it is circulated around motor, then is exhausted into air stream. Motor stays clean, cools itself!



As illustrated here, by recognizing conditions under which exhaust fans must operate, ILG Self-Cooled Motor Propeller Fans have been designed, engineered, and constructed to operate at *peak* efficiency under those conditions. The Self-Cooled Motor which makes this remarkable efficiency possible is an exclusive, patented Ilg feature.

You will note that in all cases, ILG Self-Cooled Motor Propeller Fans have the fan direct-connected to motor. Thus you get a single moving unit with nothing to get out of alignment or wear excessively . . . no noisy belts or pulleys to be aligned, then frequently adjusted, serviced, and replaced . . . no constant waste of electrical energy from indirect transfer of power. Real dividends will accrue to every fan buyer or specifier who keeps this "Inside Story" in mind when considering the type of exhaust fan to be used in a given installation.

THE PROPER FAN SIZE

Probably the most important rule that must be followed in assuring a satisfactory ventilation job is that the capacity of the fan be adequate. Too often the fan size is selected on the basis of familiarity with desk fan sizes which make ventilating fan sizes seem large, or because the most convenient place for the fan is limited to a certain size.

A ventilating system of insufficient capacity is just as unsatisfactory as a heating system that is too small. Strict adherence to recommended air changes (see Page 5) will prevent "Under-sized results".

LOCATION OF FAN AND AIR INLETS

To obtain a ventilating fan's full capacity, it is important that the fan be installed on the opposite side of the room from the air intakes. When open windows, doors, or other intakes are close to the fan, the air is "short circuited" (see Figure 1). The space in rear of room is "dead" or unventilated.

CORRECT AND INCORRECT PRACTICES IN USING PROPELLER FANS

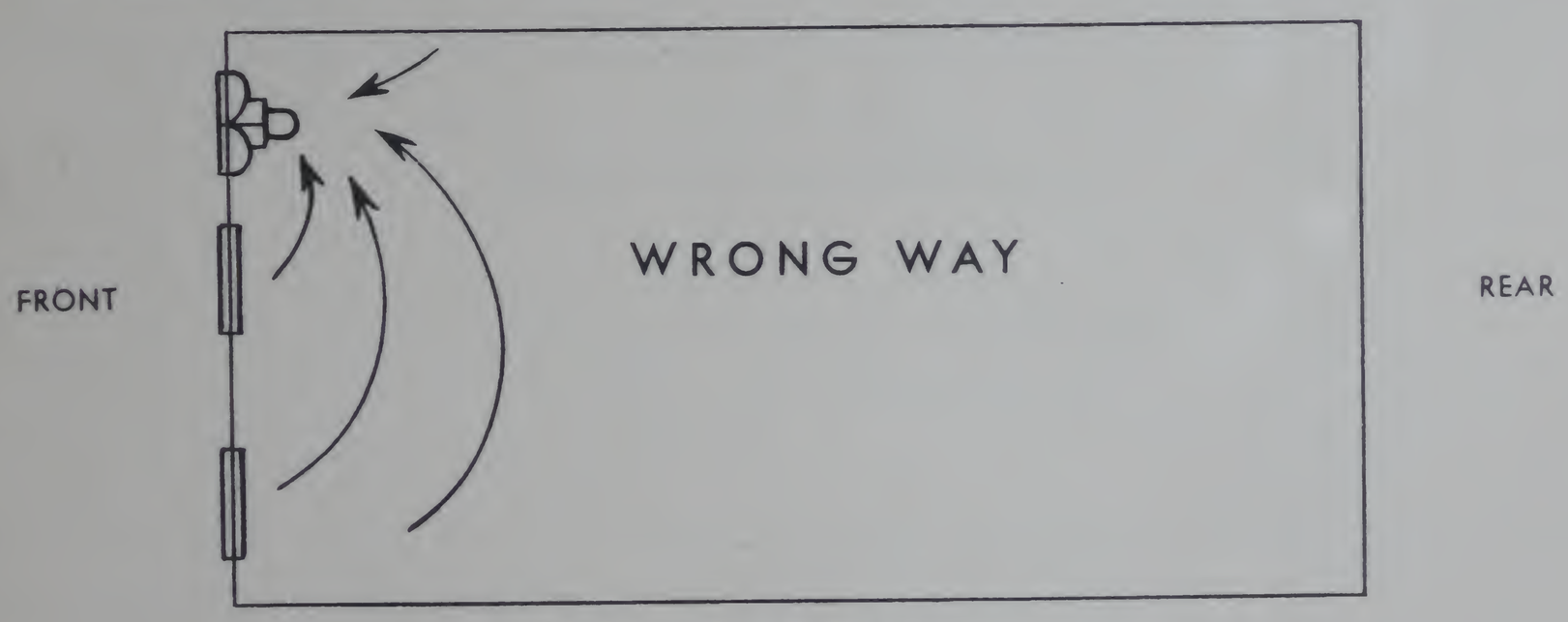


FIGURE 1

Figure 2 shows the right way to install a ventilating fan. Place fan directly opposite points of intake and keep adjacent windows closed, so proper air circulation is created throughout entire room.

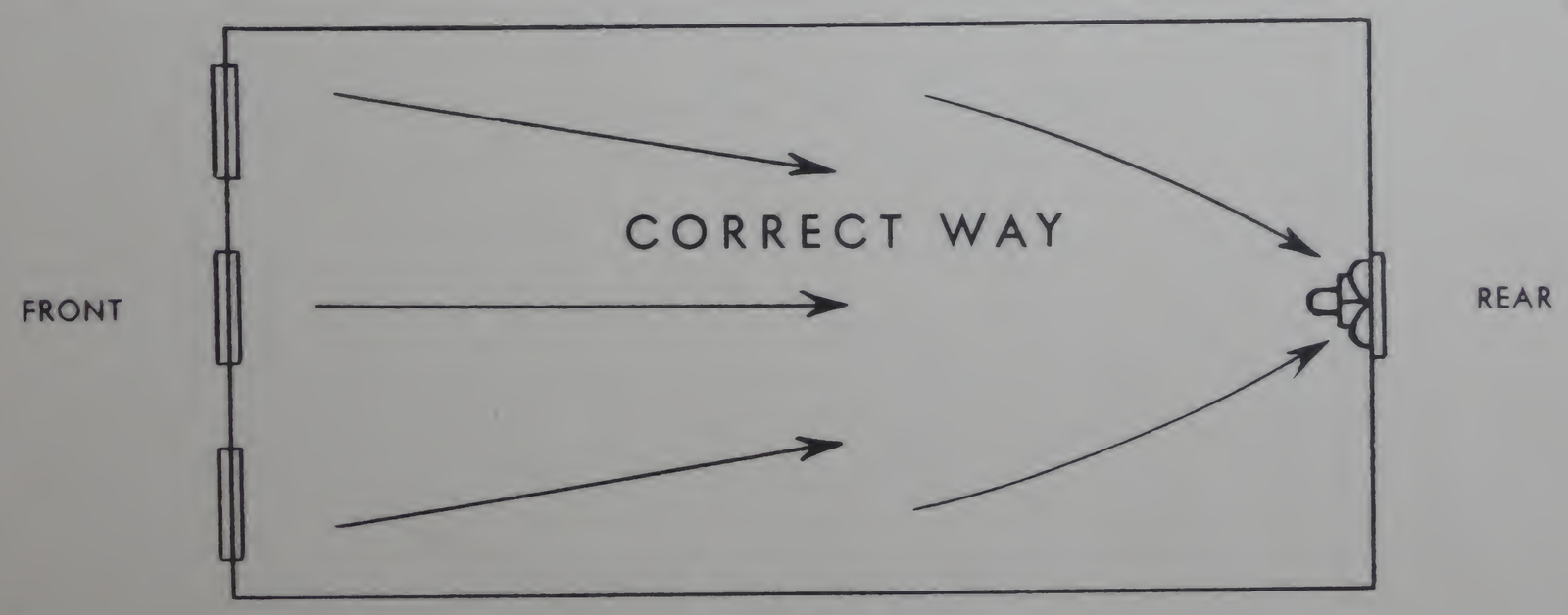


FIGURE 2

THE USE OF DUCTS WITH PROPELLER FANS

Propeller Fans are not designed to exhaust air through any great amount of duct work. At the most, no more than 30 feet of duct should be used and then it should be no less in diameter than the fan. If anything, it should be a few inches larger so as to reduce friction to the minimum.

In Figure 3, below, is shown a standard propeller fan with a reduced size of duct such as is sometimes found in use and installed by people who do not fully understand the results that follow such practice. At "A" in Figure 3, we show where the greatest friction exists. Any reduction below the size and the diameter of the fan causes extra friction with the result that if the reduction is too much, the load on the fan motor is greatly increased. Naturally, there is a great reduction in the amount of air that is exhausted, and the ventilators will not be satisfactory.

Recommended practice is shown in Figure 4 on this page. Here we show the duct slightly larger than the diameter of the fan with a flare out at the fan. This reduces the friction and allows the fan to handle the capacity which it is designed for with but a slight variation due to duct resistance.

FIGURE 3. PLAN VIEW

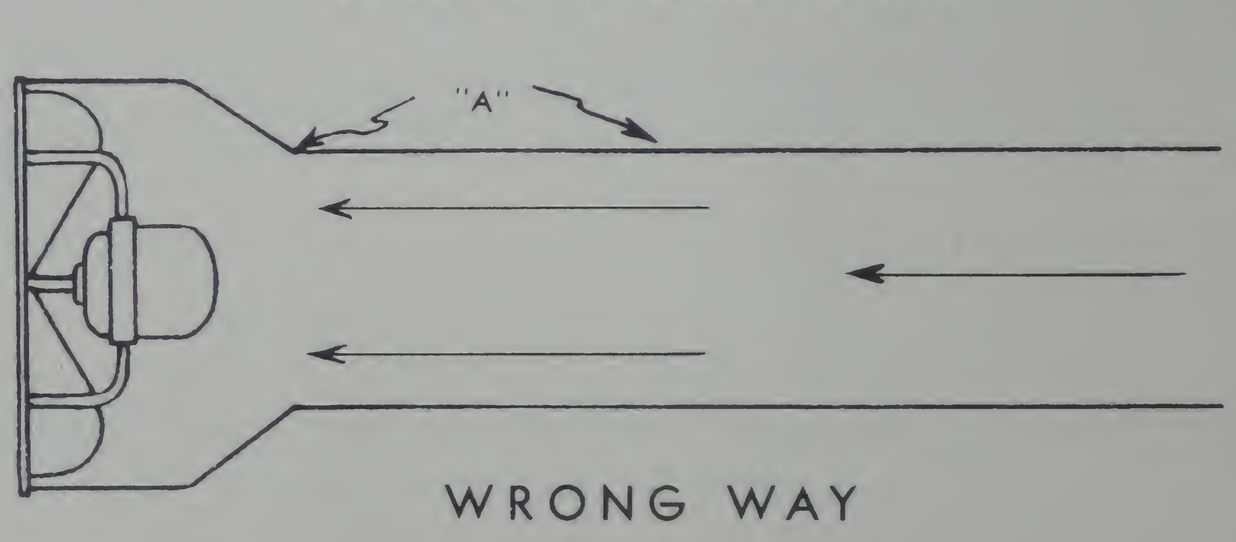
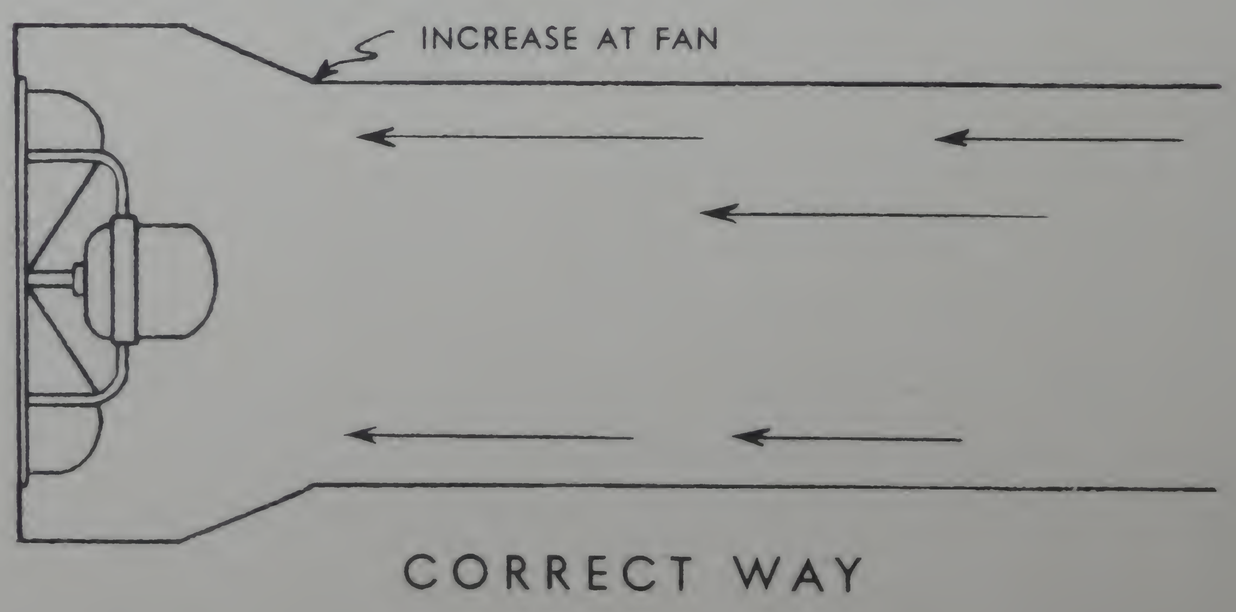


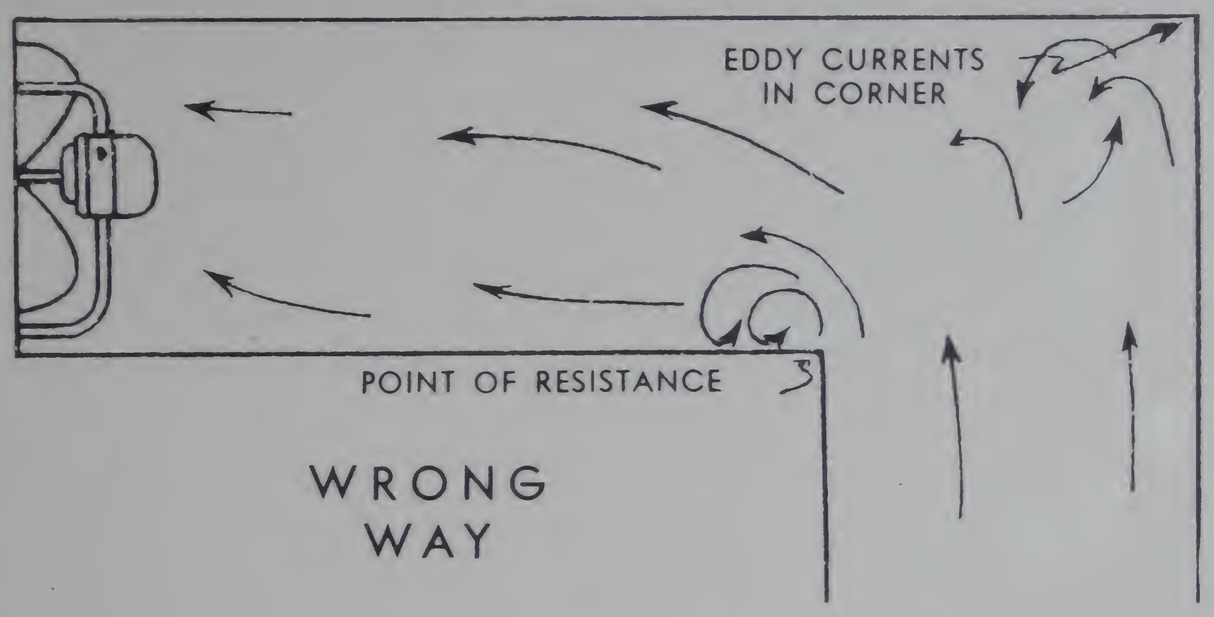
FIGURE 4. PLAN VIEW



THE USE OF DUCTS WITH PROPELLER FANS (CONT.)

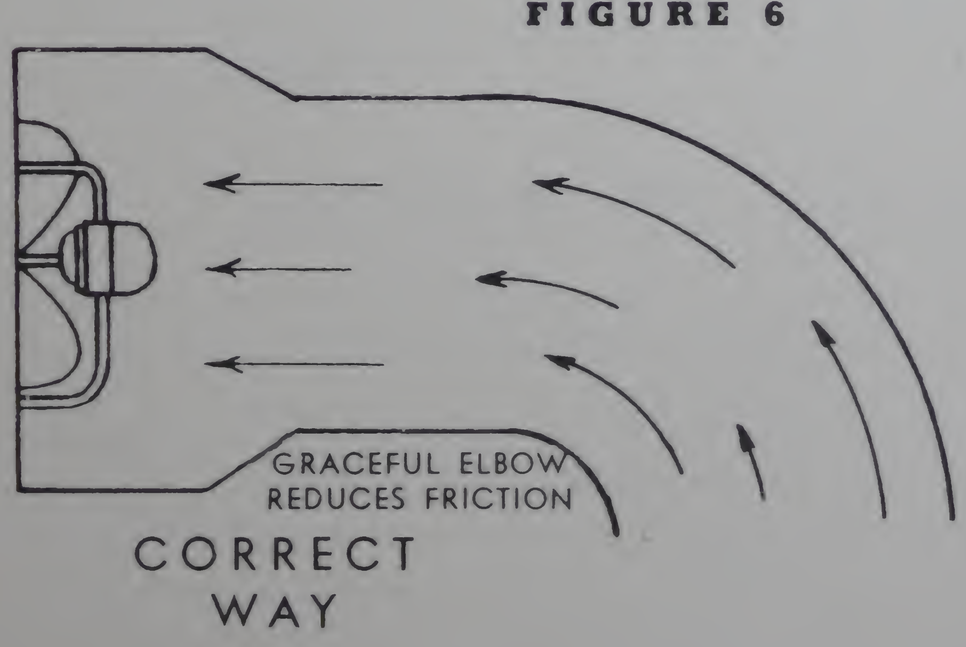
Occasionally it is necessary to install propeller fans in connection with a short amount of duct work with a right angle bend. In such cases, the bend should never be an abrupt right angle as shown in Figure 5. That is, with square corners. The proper and most efficient way to pull air around a bend, is to construct the duct as shown in Figure 6. This, you will note, constitutes a sloping bend, which allows the air to flow around with very little resistance.

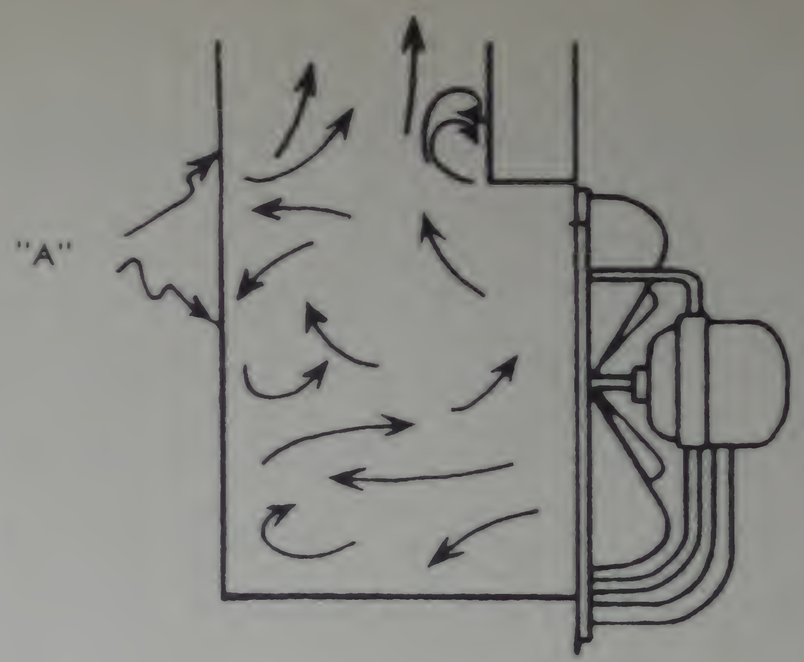
FIGURE 5



A right angle bend, such as shown in Figure 5, causes six times as much resistance as a round elbow, and, of course, reduces the efficiency of the system considerably.

FIGURE 6

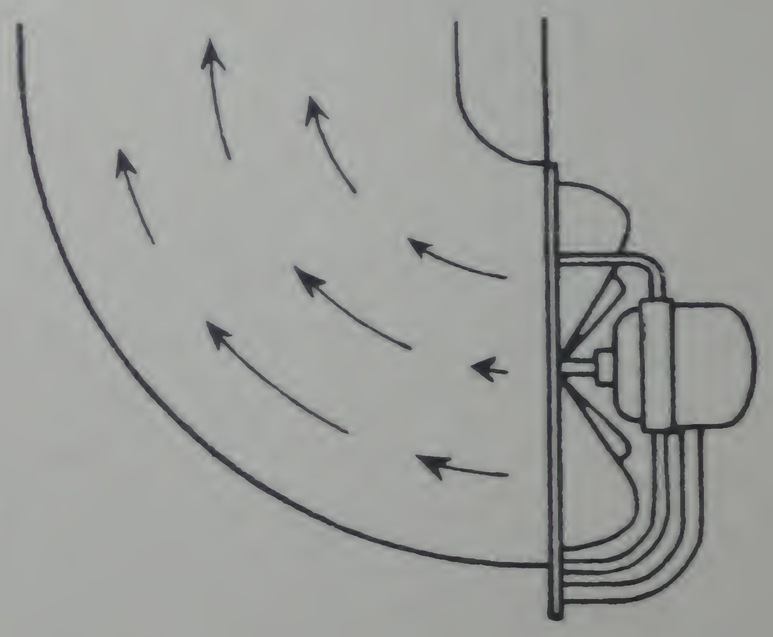




WRONG WAY

FIGURE 7. SIDE ELEVATION

It is always better practice to draw air through duct work with a propeller fan rather than to blow through it because a fan discharges the air with a spiral motion which creates added friction. Sometimes, however, circumstances require blowing through and these recommendations will serve as a guide. It is very bad practice to install a propeller fan in connection with square duct work of cramped dimensions containing less area than that of the fan. For instance — by referring to Figure 7, you will note how a propeller fan works against a very strong back pressure when installed in connection with a flat duct containing less area than the total area of the fan itself. To begin with, by blowing against the flat surface, a considerable eddying of air is caused with a very definite choking at point "A". It is like trying to push a one-inch rope through a three-quarter inch hole. The result is that the motor becomes greatly overloaded in trying to do this work.



CORRECT WAY

FIGURE 8. SIDE ELEVATION

To blow air through ducts so as to convey it to the outside, the correct method is shown in Figure 8. Here you will note the duct is slightly larger than the diameter of the fan and the bend in the pipe is gradual, allowing the air blowing into the duct to take the curve with a minimum of restriction. As stated on Page 8, about 30 feet of duct work is the limit for a propeller fan to perform efficiently, unless the duct is made over-sized and does not have more than one bend or turn. If a vertical duct is on the inside of the building, then there is considerable natural draft caused by the "stack or flue" effect in the duct itself. If it is on the outside of the building, cold air strikes the surface of the duct and causes the air discharged by the fan to chill quickly and become heavy so that a greater pressure is required to overcome the effect. If the system requires duct work of considerable amount, then a blower system should be used as illustrated on Pages 16-24.

THINGS TO AVOID

SCREENS: It is not desirable to use a fly screen on the outside of a Propeller Fan for the reason that dust, grit, grease, etc. soon clog the openings up so that it is impossible for air to get through. In fact, the screen itself offers nearly 50% resistance even when it is clean. Under no circumstances place screens on the outside of a fan. An ILG Automatic Shutter will keep insects out.

DOORS or TRAPS: Never use a door on the outside of a fan. It may not be open while the fan is running, thereby creating an undue resistance which will result in overloading the motor. Often these doors are blown shut by a strong outside wind unknown to the user, with the same result as outlined above. ILG Automatic Shutters are recommended for use with Propeller Fans. They open and close automatically with the operation of the fan and prevent cold air and dust from entering when the fan is not in operation.

VENTILATING ONE ROOM THROUGH ANOTHER

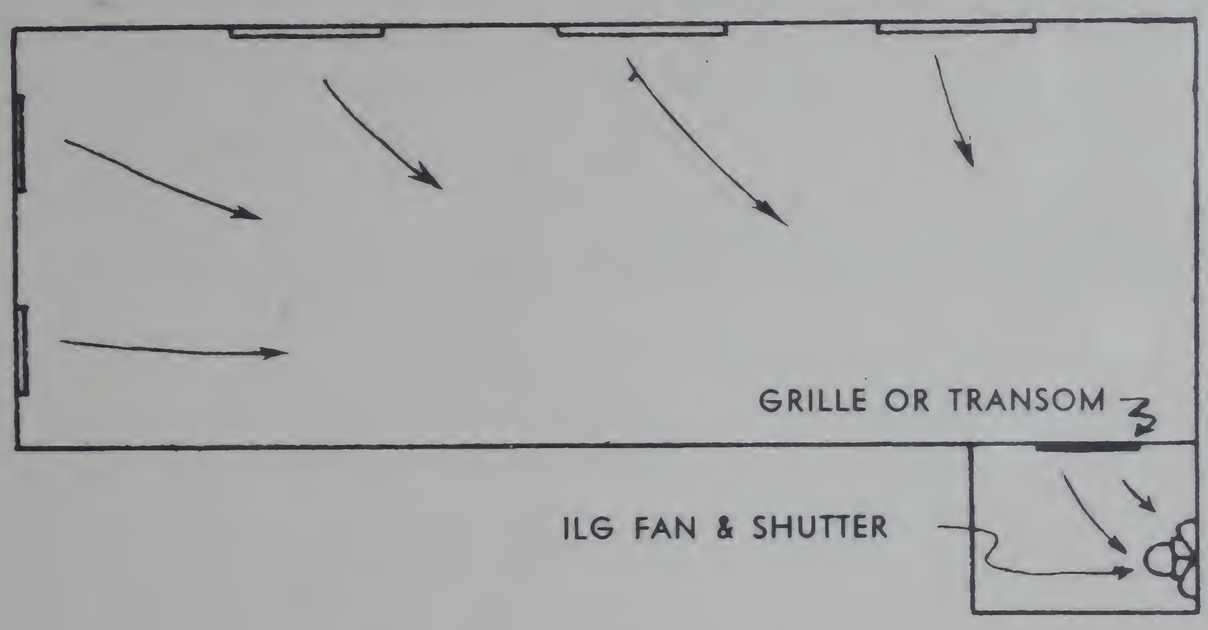


FIGURE 9. PLAN VIEW

It is possible to ventilate various rooms through other rooms, as indicated in Figure 9. By placing an ILG Fan of the proper size in a store room, toilet, or any other room as shown, with a grille in the wall, a circulation can be created and two or more rooms ventilated simultaneously. The proper location of the grille is important.

This particular system is a good one to recommend wherever it is important that the system should be absolutely quiet. As can be seen, the fan is out of sight and would be unheard in adjacent rooms. It is important that the grille in the wall should have free area equal to that of the Fan. For instance, if the Fan is 24″ in size, which equals a total area of 452 square inches, the grille or register face should have an equal amount in free area. It should be remembered that the average grille has about 50% restriction in the way of scroll or mesh work, hence the size should be doubled. For instance, 2 x 452 or 904 square inches, which, when squared up, would be approximately 30″ x 30″ square. This size of register would have 452 square inches of free area, same as the Fan.

ILG Automatic Shutters should always be used on the outside of the fan, to exclude back drafts, rain, snow, etc.

VENTILATING THE "BLIND" ROOM

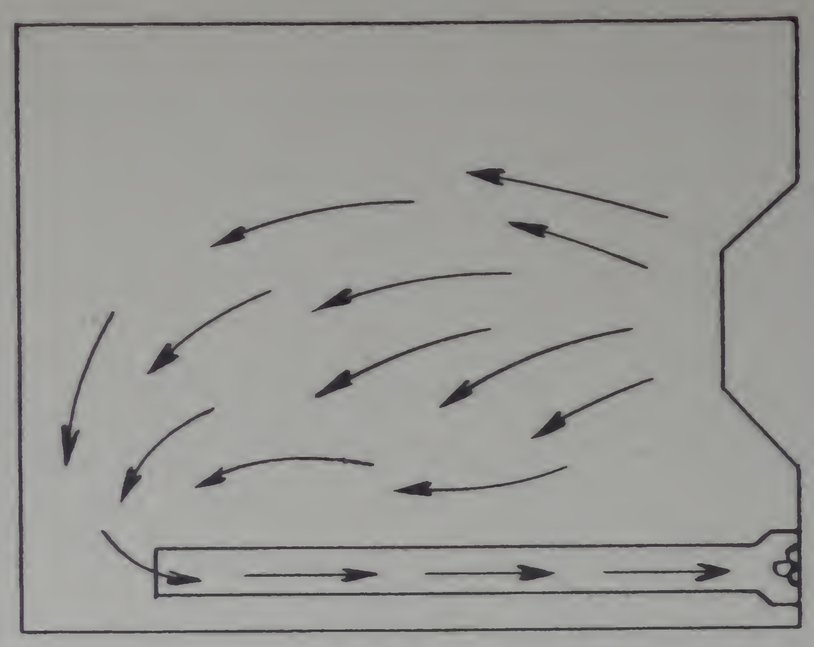


FIGURE 10

A "Blind" Room is one whose only outside wall is the front. Excepting the case of the one-story building which permits the use of a power roof ventilator, the ventilating fan must, therefore, be installed in the front. To avoid short-circuiting of the air across the front of the room from the door to the fan, it is a good practice to enclose the fan in a duct of proper size leading back to the rear of the room. As shown in Figure 10, this assures proper ventilation in every part of the room.

VENTILATING SOURCES OF AIR POLLUTION

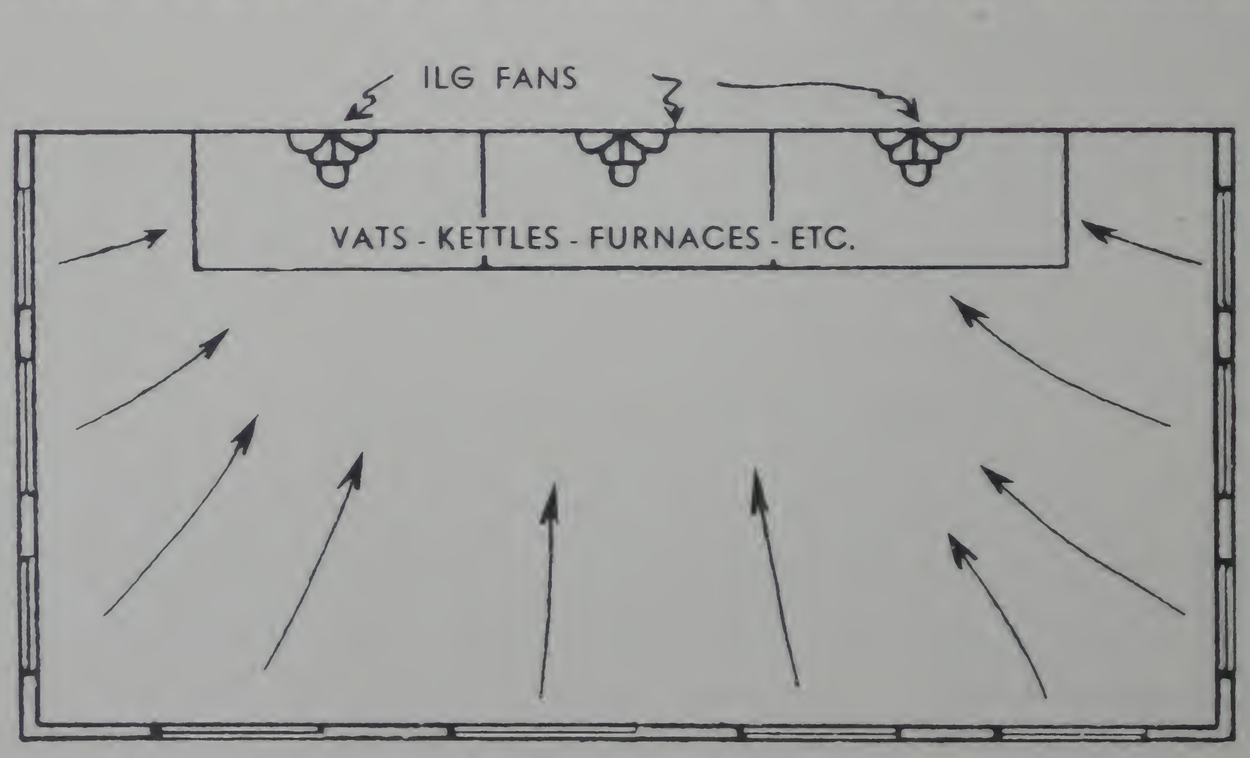


FIGURE 11. PLAN VIEW

In practically every factory, foundry, creamery, etc., problems of removing dust, steam, fumes, over-heated air, etc. will be found. It is a very simple matter to take care of this. An ILG Fan should be placed over, or as near to the point of difficulty as possible. In this way, all the objectionable air is exhausted directly to the outside and fresh air is drawn into the room, past the workers, towards the vats, ovens, steam kettles, furnaces, etc., as shown in Figure 11, above.

Should the vats, kettles, etc. be located in the center of the room in a one-story building or on the top floor, then an ILG Power Roof Ventilator is recommended. By placing this directly over the part of the room where the difficulty exists, the same results can be obtained as outlined above. In multi-story buildings, fans can be placed in side walls with straight ducts, of a diameter a little larger than the fans, run to the area where fumes or heat are produced.

SKYLIGHT INSTALLATIONS

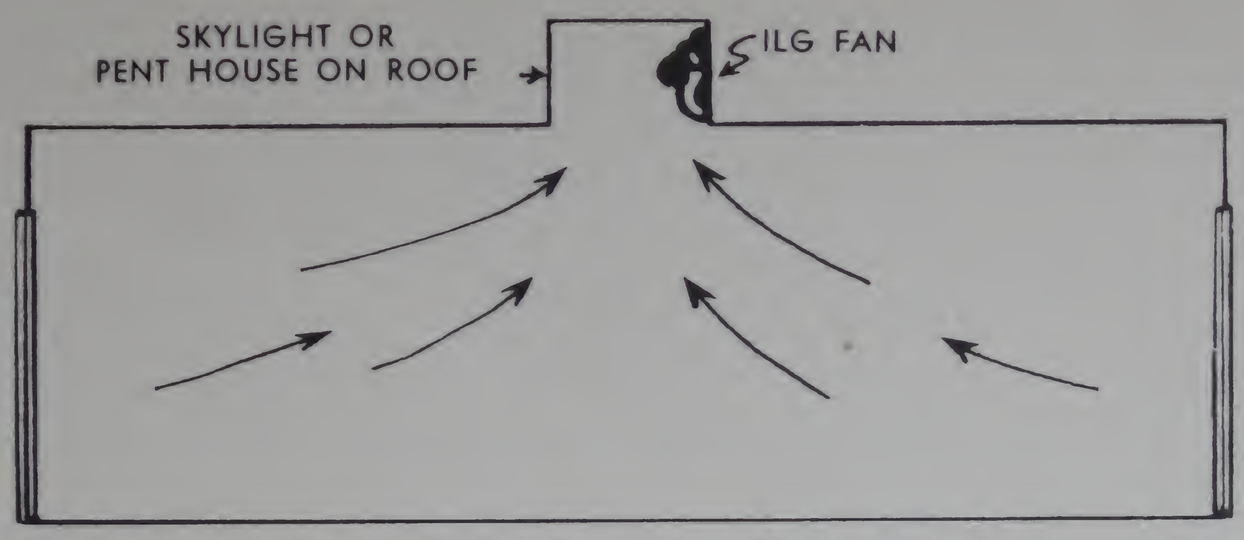


FIGURE 12. SIDE ELEVATION

Often a skylight is located on the roof over the middle of the room. In this case, an ILG Fan can be placed in the same way as shown in Figure 12 on this page.

THE USE OF FANS IN PENTHOUSES (POWER ROOF VENTILATORS)

In buildings where roof ventilation provides the most practical means of exhausting foul air, the use of the ILG Fan in a penthouse (the ILG Power Roof Ventilator) has been found highly efficient and economical. The ILG Power Roof Ventilator, powered by electricity, is not dependent in any way on temperatures, wind velocity, or direction and provides the same steady ventilation as the ILG Propeller Fan that is installed in a wall or window.

INSTALLATION IN BUILDING WITH FALSE CEILING

Where there is a ceiling as in Figure 13, grilles can be placed at several points in the ceiling, thereby using the attic space as a plenum chamber or air space. Operation of the fan draws the air from the room below, up through the grille and through the attic space, to the penthouse. Obviously, all other openings into the attic space, through the roof or through the side walls, should be closed to prevent short-circuiting of the air stream which would result in only a portion of the air coming from the room being ventilated.

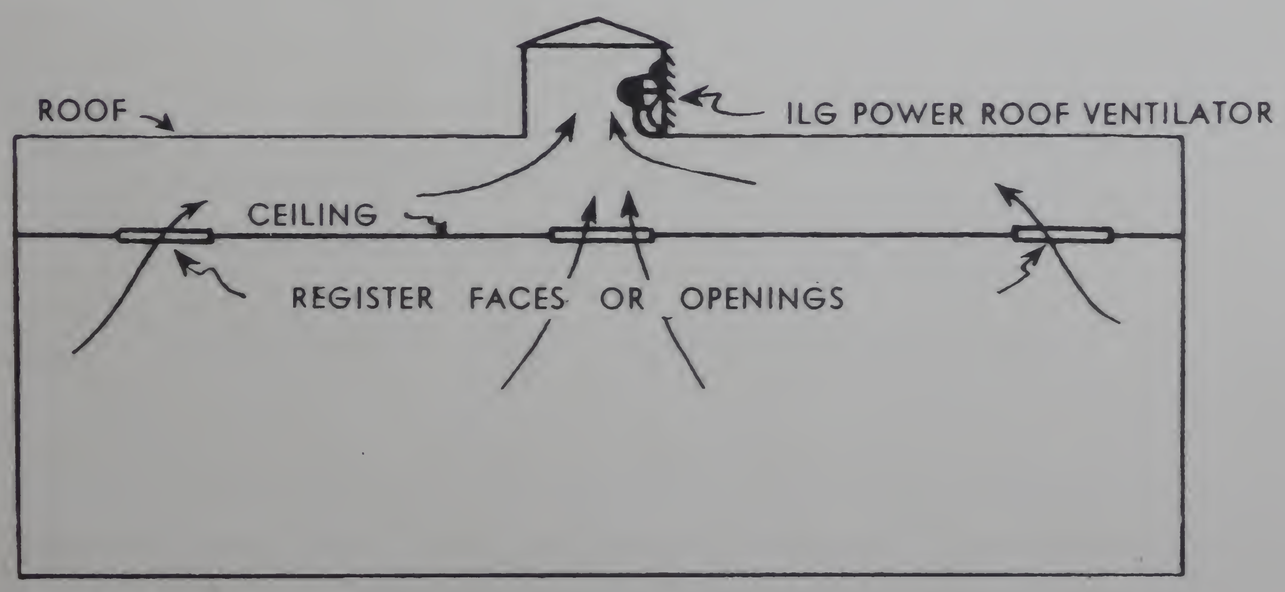


FIGURE 13

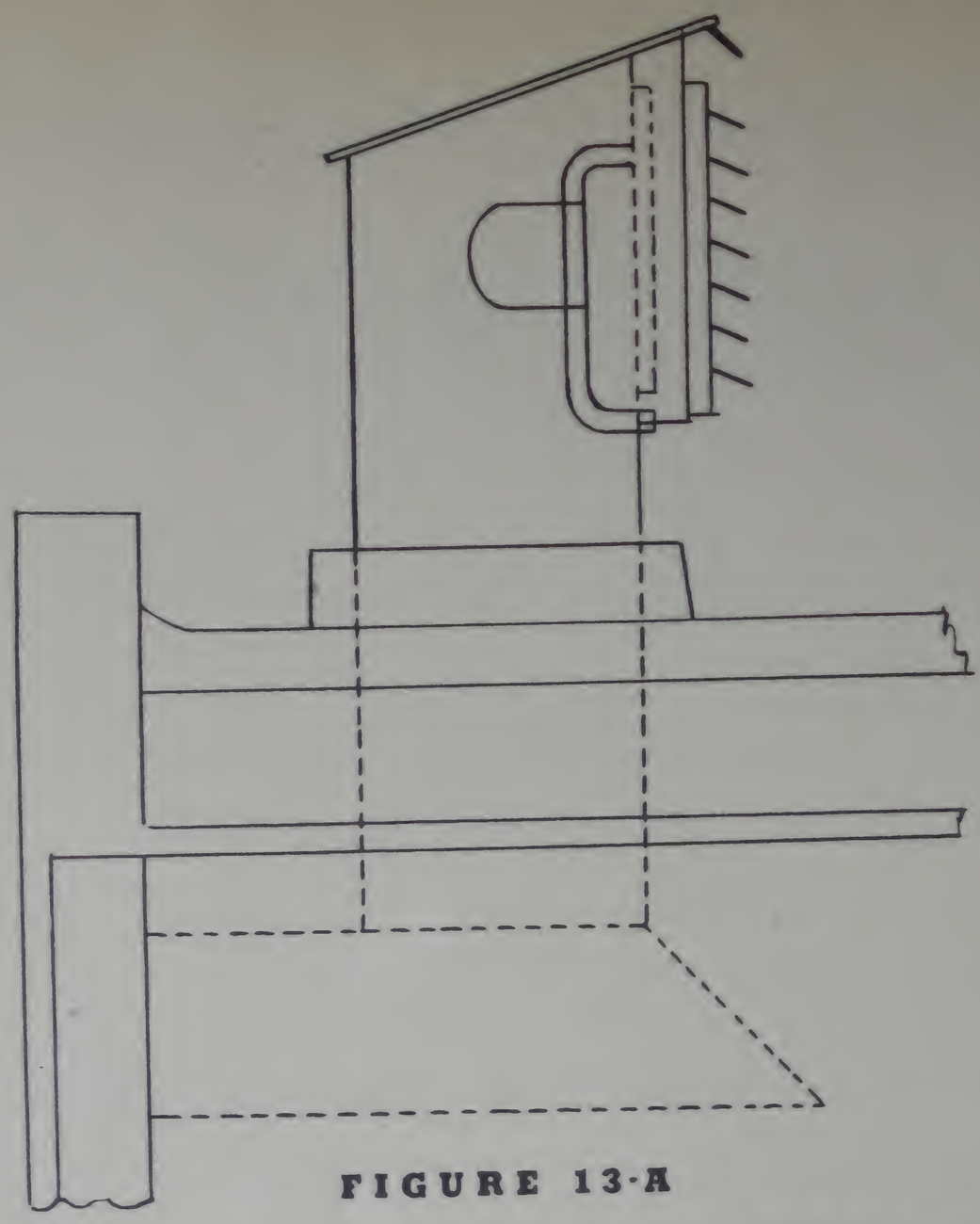


FIGURE 13-A

THE USE OF PENTHOUSE FANS TO EXHAUST FROM HOOD

A simple and satisfactory method of exhausting from hoods is to mount an ILG Power Roof Ventilator consisting of an ILG fan and penthouse on the roof directly over the hood, dropping a duct down to connect to the hood as shown in figure 13A.

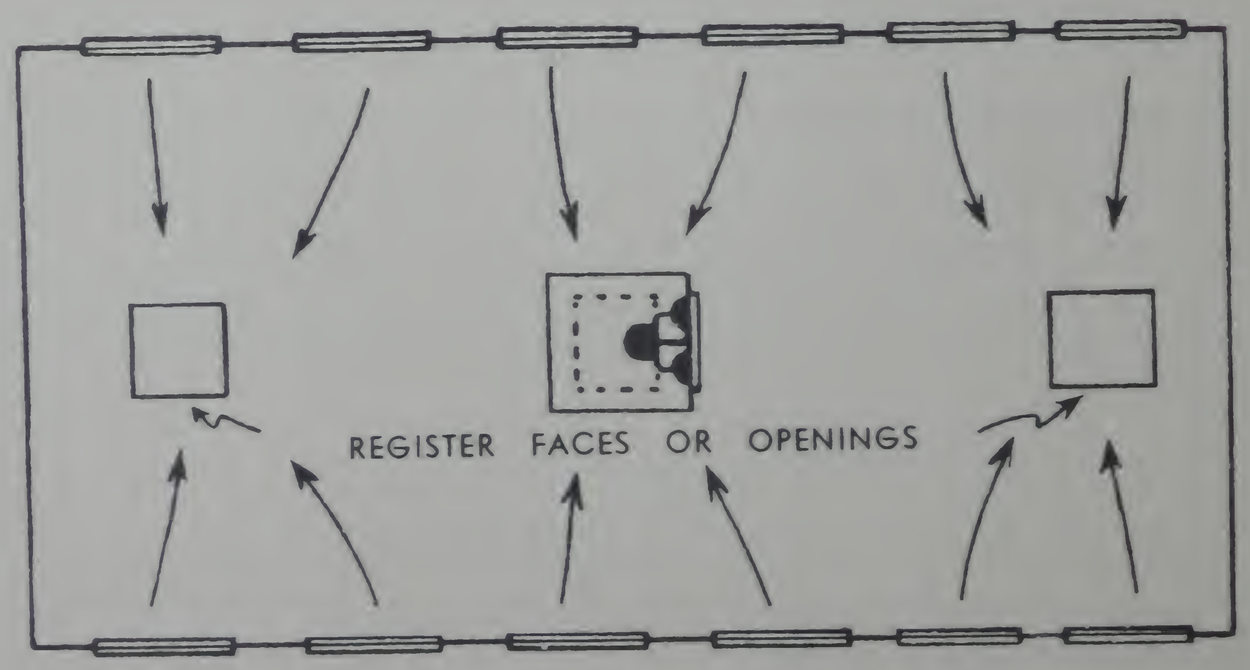


FIGURE 14. SIDE ELEVATION

PLACEMENT OF GRILLES

Where window or door openings are on opposite sides of the room the grilles should be placed in the center of the ceiling as in Figure 14. Where windows are only on one side of the room, the grilles should be placed close to the opposite wall to provide air circulation across the entire room.

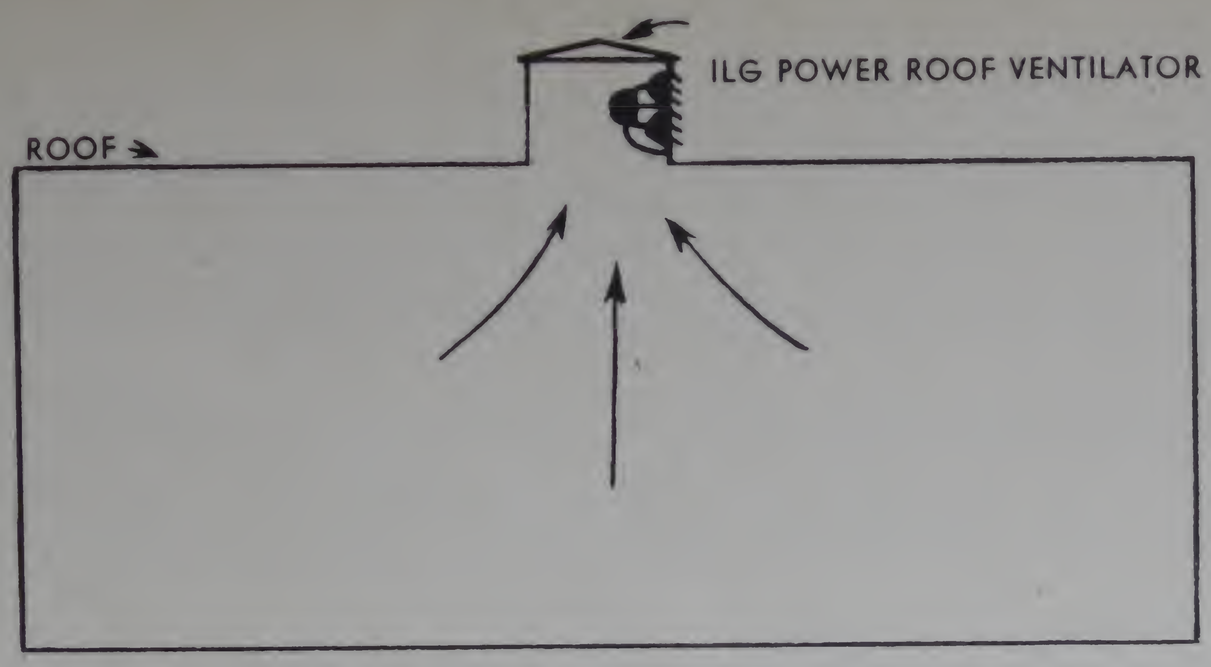


FIGURE 15. SIDE ELEVATION

Figure 15 shows a single roof construction building. This construction is found in factories, garages, etc. In buildings with a large floor area, more than one ILG Power Roof Ventilator is recommended. These should be placed so as to give equal distribution. Where certain sections or parts of the building only need ventilation, then the ventilator is placed over that particular space.

MULTI-STORY BUILDINGS

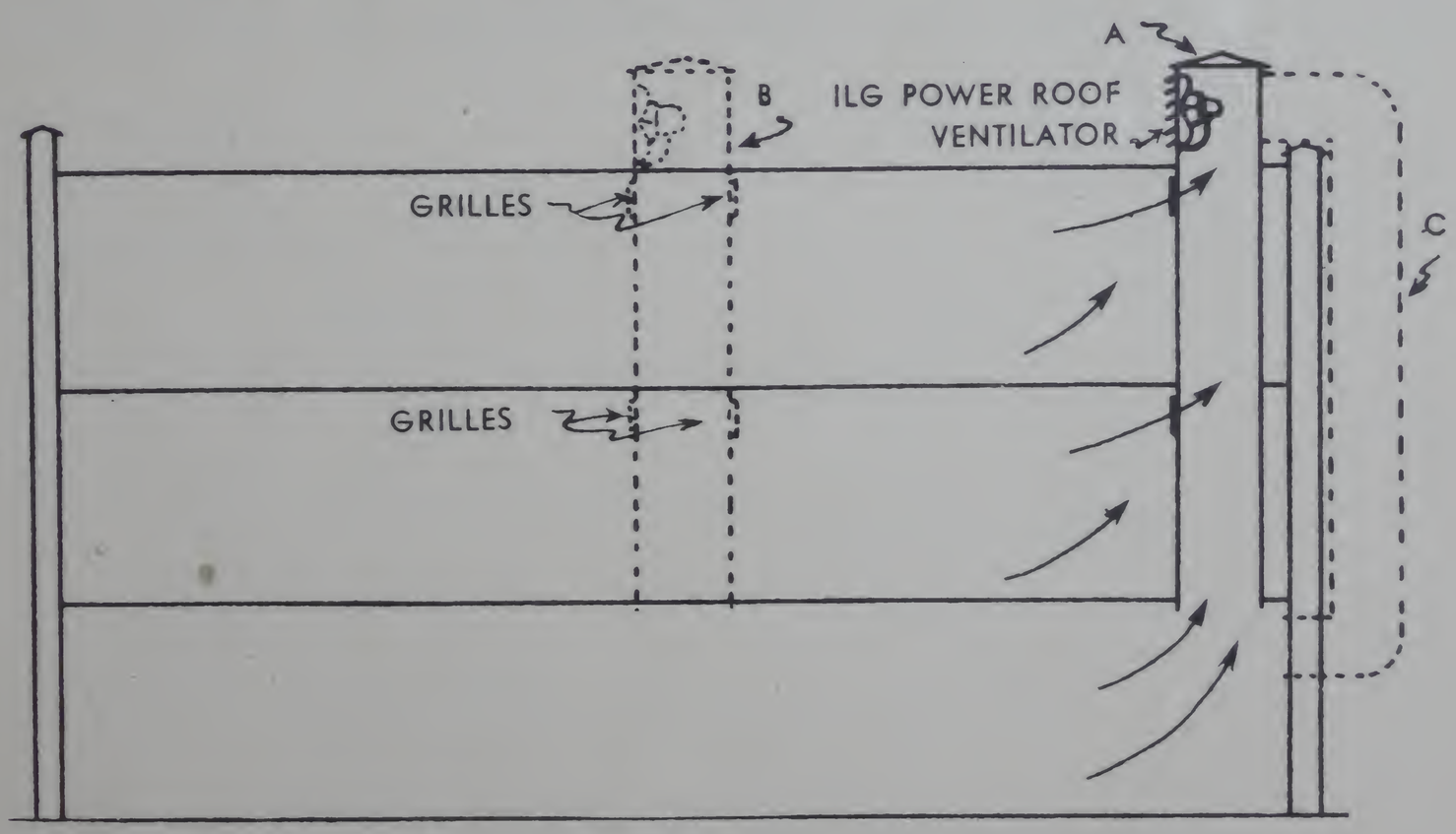


FIGURE 16. SIDE ELEVATION

It is possible to ventilate several floors of a multi-story building as indicated in Figure 16. In some cases, it is desirable to place the ILG Power Roof Ventilator in the rear of the building with a duct dropping vertically through the various floors connected with the basement, as shown at "A". A register is placed in the duct on each floor. These are proportioned so that the necessary amount of air can be drawn from the different floors to suit the conditions. This particular application applies where the rear windows are kept closed. The circulation of air would be from the front to the rear, through the entire space.

In other cases, where the windows are open in front and rear, the ILG Power Roof Ventilator can be placed in the center of the building with a duct dropping through the floors as indicated with the dotted lines at "B". Here two registers are placed in the duct on each floor if necessary. Either one of these systems works perfectly and is recommended for stores, office buildings, and factories where there are two or more floors, particularly in new buildings when the system can be installed as part of the building.

Another method commonly used is shown at "C". This consists of an ILG Power Roof Ventilator installed as at "A" except the duct runs down along the outside wall in rear. Basements and lower floors are ventilated this way with the same effect that "A" and "B" would produce.

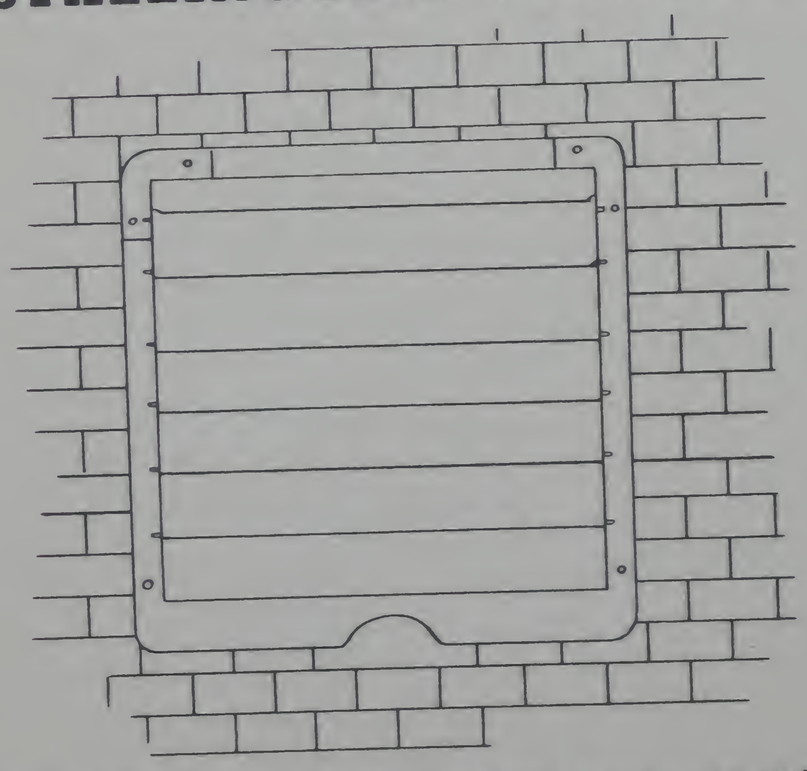
WHERE SPECIAL CONDITIONS REQUIRE SPECIAL FANS

Under certain conditions, it is necessary that special materials or construction be used in a ventilating fan so that it may operate with regular satisfaction for a normal period of life.

For instance, where steam or excessive moisture is encountered, the fan can be finished with an asphaltum base paint; this paint is also suitable for mild acid conditions. Regular inspection of the fan is desirable regardless of precautions taken in using special finishes or construction. Where moisture is met, it is usually desirable to vacuum-impregnate the motor windings also.

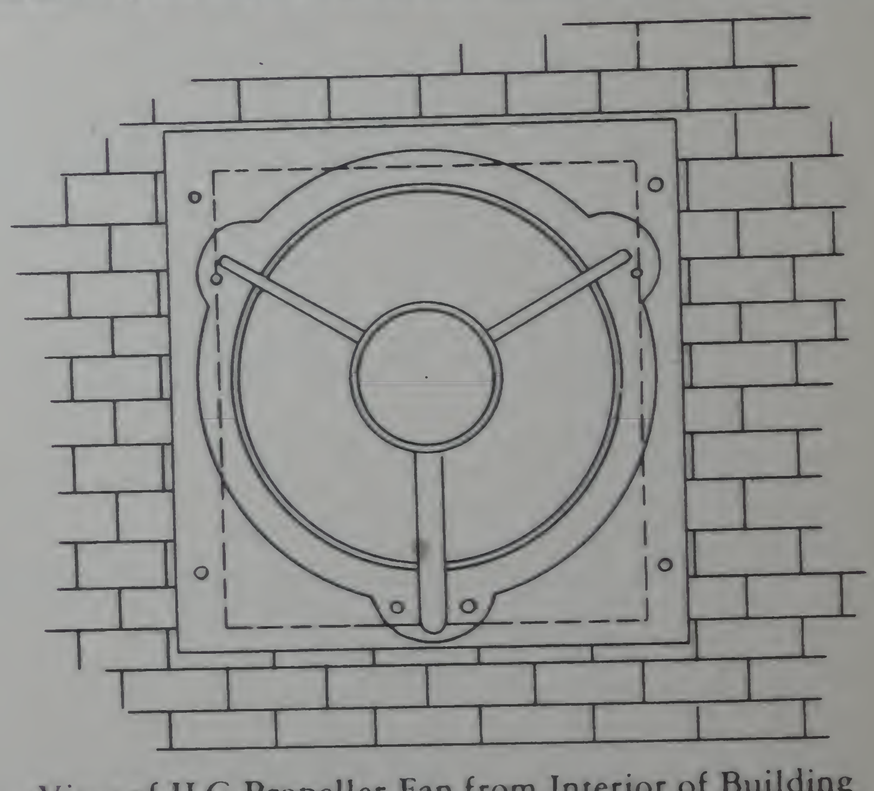
INSTALLATION SUGGESTIONS

INSTALLING FAN AND SHUTTER IN BRICK OR CONCRETE WALL:



View of ILG Automatic Shutter from Exterior of Building

FIGURE 17



View of ILG Propeller Fan from Interior of Building

FIGURE 18

The wall opening may be made by either using a form during erection of the wall or by removing bricks or concrete from an old wall. A rectangular opening is recommended to utilize the entire area of the Automatic Shutter. There have been cases where a round opening has been used to fit the Fan frame, but when the Automatic Shutter was applied to the outside of the wall, a considerable part of its effective area was lost.

In any event, the opening in the wall must be large enough to clear the flange on the Fan ring, the dimensions of which may be found in the ILG Propeller Fan Catalog.

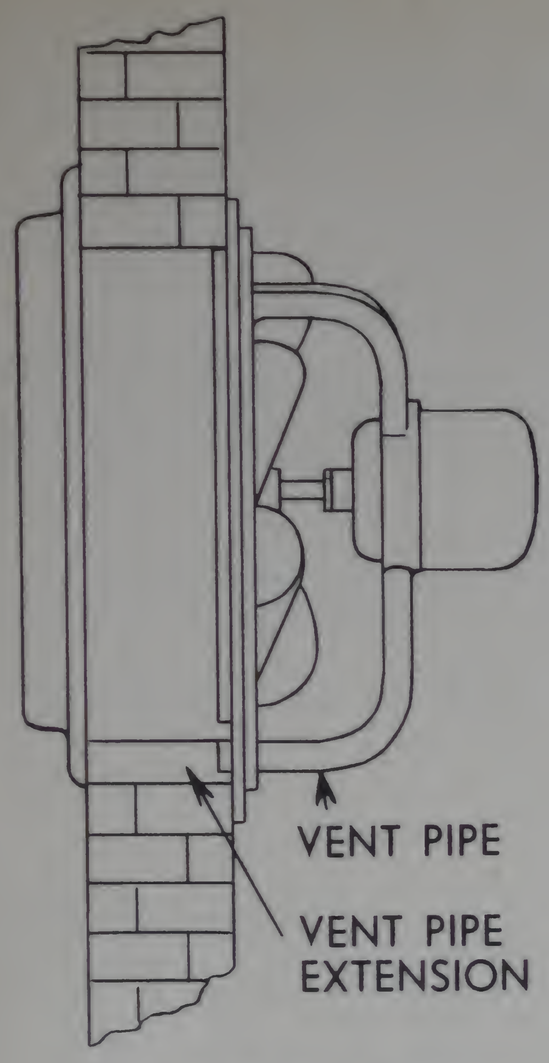


FIGURE 19
Side View of Fan and Shutter in Brick Wall

In the opening made, build a wooden frame of two-by-four or two-by-six members and secure to wall with expansion bolts. Leave clearance in the center of the bottom member to clear the vent pipe extension. To operate properly, the vent pipe must be extended to draw in air from the outside of the building. If this is not done, the exhaust air from the space between Fan and Shutter will be drawn into the Motor.

For instructions on mounting Fan to panel with a spacer, also sound-proof mounting of Fan and Shutter, see Figures 21 and 22 on Page 18.

Use individual bolts to mount Fan to panel, panel to wall and Shutter to wall. If through bolts are used between panel and Shutter, there will be a tendency for the parts to collapse if either the Shutter or Fan is being removed. Standard lag screws and expansion bushings are recommended for this purpose.

The location of the frame in the wall should receive careful attention since it is essential that the Fan frame be practically even with the inside face of the wall. If the Fan is indented too deeply in the wall, the periphery of the wall is restricted and the Fan capacity will be reduced.

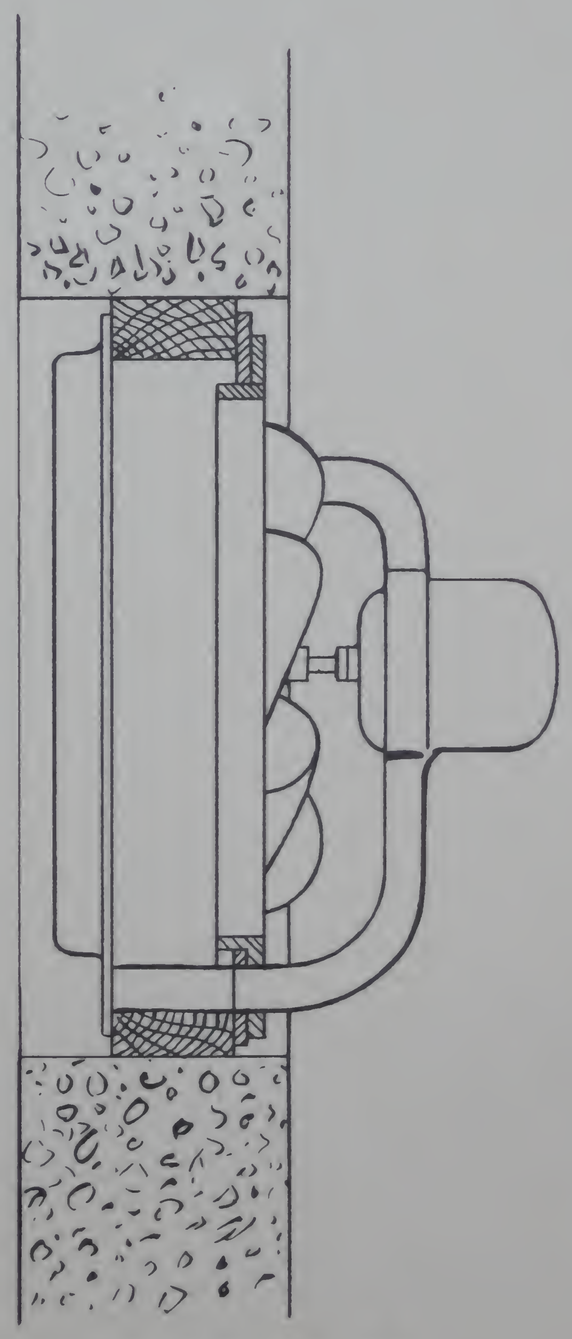


FIGURE 20
Side View of Fan and Shutter in Concrete Wall

SOUND-PROOF MOUNTING OF FAN AND SHUTTER:

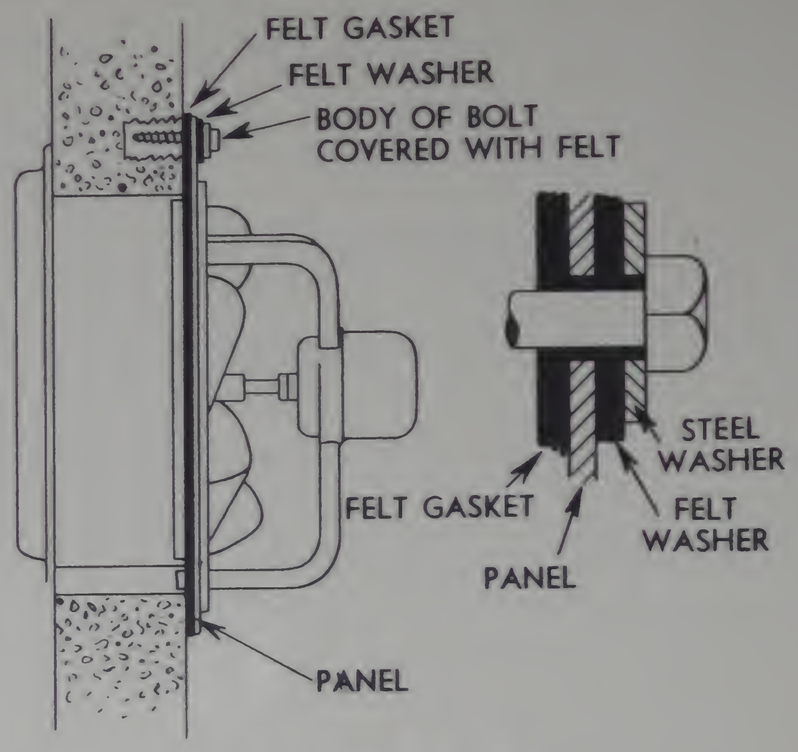


FIGURE 21

Illustrated above in Figure 21 is a practical method to follow in minimizing noise of operation. Isolation is provided by placing a resilient material, such as a felt gasket, between the panel on which the Fan is mounted and the wall. Particular care should be exercised to see that the mounting bolt is entirely isolated (see close-up view in Figure 21). Resilient material around the body of the screw and between the panel and washer is advisable. Isolation is not required for the Automatic Shutter. For other mounting instructions, see Pages 16 and 17.

MOUNTING FAN ON PANEL WITH SPACER:

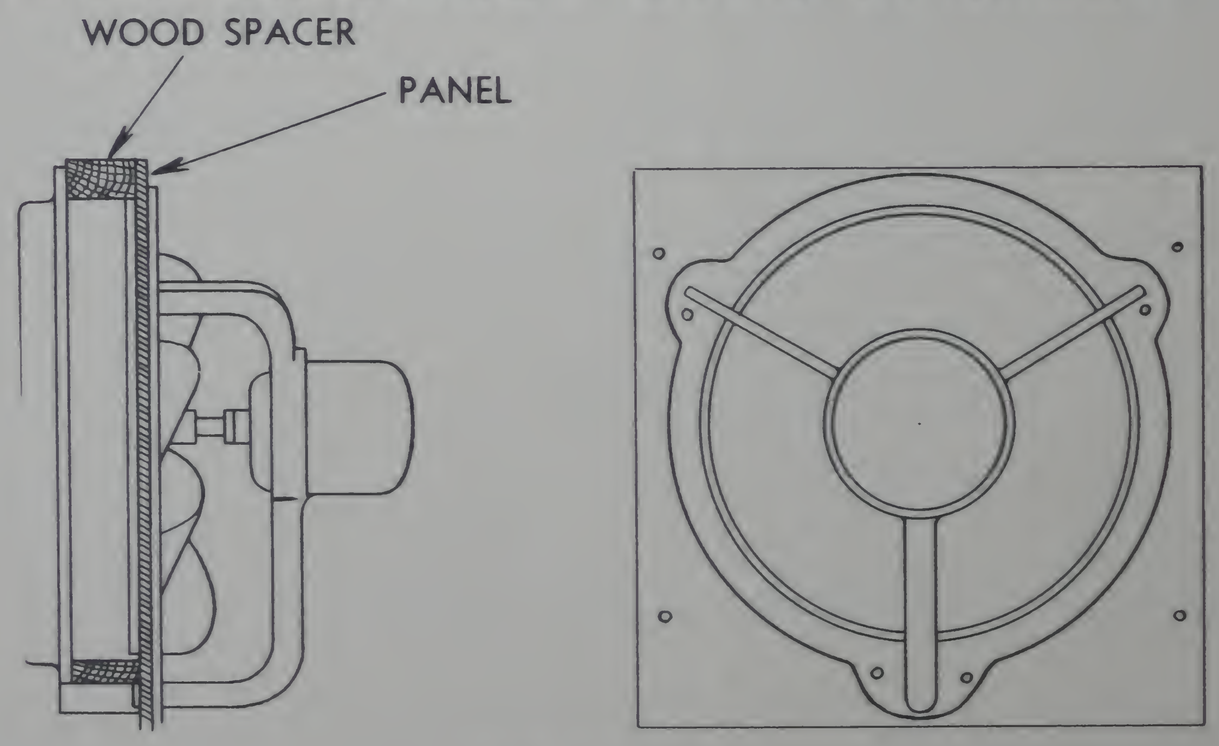


FIGURE 22

When mounting Fan in a wall, in a window, or in a skylight, it may be advisable to use a spacer between the Fan mounting panel and the Fan frame. Figure 22 pictures the proper method for such an installation, using a spacer of $3\frac{1}{2}''$ or $4''$ in width. This combination may be considered as a unit and mounted as shown on Pages 16 and 17.

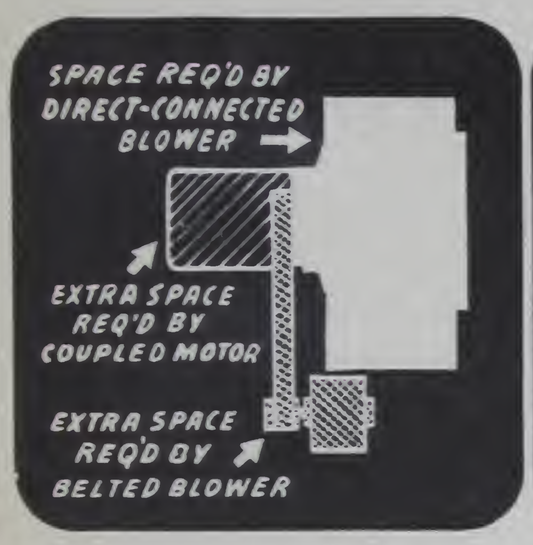
In all cases, either wooden or metal panels and spacers may be used. Wooden panels will minimize noise of operation, but metal panels may be preferable in certain cases from a fire hazard standpoint.

Facts

YOU SHOULD KNOW ABOUT UNIVERSAL BLOWERS

1 A blower draws in air from one system of ducts and forces it through another system . . . brings in outside air, exhausts "used" or impure air . . . also used for circulating either warmed or cooled air.

2 Although Ilg makes *both* belted and direct-connected blowers, direct-connected type is usually recommended to save money-wasting friction from reduction of high speed motors through belts, pulleys.



3 Direct-connection of motor and wheel permits recession of motor in blower housing . . . compact . . . requires minimum floor space. Note *extra* space required by belted blower or blower driven by coupled motor.

4 Each Ilg Direct-Connected Blower is engineered and manufactured as a balanced, integral unit . . . self-contained . . . tested under load conditions . . . shipped completely assembled . . . "factory-set" alignment.

5 Ilg Blower arrives on skids . . . rolled or suspended into position . . . bolted down, ready to operate. No belts, pulleys or guards to buy, no mounting of motor—no aligning or adjustment on the job.

6 Install anywhere—on floor, wall, or ceiling. (Many installations are practicable *only* with direct-connected blowers). 64 different discharge arrangements. Direction of rotation quickly and easily changed.

7 Powered by **all-Ilg-built motors** specifically designed for air-moving applications, each Ilg Direct-Connected Blower is covered by a "ONE-NAME-PLATE" guarantee, including *both* motor and blower . . . assures *undivided responsibility!*

With wheel mounted directly onto motor drive shaft, ILG Direct-Connected Blowers have a single moving unit rotating on heavy-duty, grease-packed, anti-friction ball bearings. There is nothing to get out of order or wear excessively . . . no belts or pulleys to be replaced . . . no daily waste of electricity from indirect transfer of power . . . no need for constant adjustment and dressing of belts. You save money every day all along the line . . . on installation . . . on servicing . . . on maintenance.

In cases where savings are comparatively unimportant in view of the job to be handled, consideration should be given to the continuous operation and freedom from break-down offered by direct-connected units. With fewer parts . . with those fewer parts of more substantial construction and less subject to excessive wear from misalignment . . . common-sense will deduce that direct-connected blowers will operate for longer periods without trouble. And experience definitely bears this out!

ILG UNIVERSAL BLOWERS
METHOD OF FIGURING DUCT SIZES

After a decision has been made on the amount of air the system is to handle in accordance with the recommendations shown on Page 5, the next step is to determine the duct sizes. Recommended velocities of air in the ducts are shown below.

VELOCITIES

By velocity is meant the rate or speed of the air travel through ducts or openings. Suggested velocities should be maintained as higher velocities result in increased electric power consumption. The volume of air and the velocity at which it will be moved governs the size of the duct. If the velocity is increased, a smaller duct is required. If the velocity is decreased, a larger duct will be needed and the first cost of the duct system will be greater than in the first case, but to compensate for this, the power requirement will be lower for a given volume of air.

EXAMPLE:

Assume a straight duct 100 ft. long, open at the far end, through which must be delivered 4,000 CFM. If this air passes through the duct at a velocity of 1,200 ft. per minute, the size of the duct will be 24″ in diameter and the pressure loss will be .104″.

If this volume passes through the duct at a velocity of 2,400 ft. per minute, the size of the duct will decrease to 18″ in diameter and the pressure loss will equal .552.

AIR SUPPLY SYSTEMS

	QUIETNESS IMPORTANT	QUIETNESS NOT IMPORTANT
Main Ducts	1000 to 1200 ft. per min.	1200 to 1800 ft. per min.
Branch Ducts	500 to 800 ft. per min.	800 to 1000 ft. per min.
Branch Risers	500 to 700 ft. per min.	800 ft. per min.
Registers	Depends on type of Register used. Follow Manufacturer's Recommendations.	

AIR EXHAUST SYSTEMS

	QUIETNESS IMPORTANT	QUIETNESS NOT IMPORTANT
Main Ducts	1000 to 1500 ft. per min.	1300 to 2000 ft. per min.
Branch Ducts	800 to 1200 ft. per min.	1000 to 1500 ft. per min.
Branch Risers/Registers	Depends on type of Register used. Follow Manufacturer's Recommendations.	

DEFINITIONS

Velocity — equals Air Speed in feet per minute.
CFM — equals Cubic Feet of air per minute.
Area — equals Length times Width in Square Feet.

FORMULAS

With the following simple formulas, duct sizes and velocities can easily be figured.
CFM divided by VELOCITY equals AREA in square feet.
CFM divided by AREA equals VELOCITY.
VELOCITY times AREA equals CFM.
For example, see next page

EXAMPLE:

Assuming that 1500 CFM is to be moved at a velocity of 1000 feet per minute. 1500 divided by 1000 equals 1½ (square feet times 144 equals area in square inches, so 1½ times 144 equals 216, this being the square inch area of duct). This duct can be made in any shape, round, square, or rectangular to suit the space available, 17″ round, 15″ x 15″ square or 12″ x 18″.

GENERAL PRINCIPLES OF DUCT DESIGN

Metal ducts are preferable, because it is possible to obtain smooth surfaces, thus avoiding excessive resistance to the air flow. Metal ducts can also be worked into compact sizes, shapes, etc.

Duct systems can be put into two general classes when used for ventilation.

1st. Those systems where the movement of air is of prime importance, without regard to quiet operation or power economy. In those systems, the air velocity should be high.

2nd. Those systems where air must be moved quietly and with power economy. In those systems, the air velocity should be low.

Pressure losses in duct systems are caused by the velocity of the air flow, number of elbows, and friction of air against the sides of the duct. The use of heating coils, air filters, air washer, dampers, and deflectors all increase resistance to the air flow.

Metal ducts are usually made of galvanized sheet iron, and the sheets are made in various weights or gauges, and the diameter or width of the duct, if it is to be rectangular, determines the gauge of metal to use. Following are the recommendations:

ROUND DUCTS		SQUARE DUCTS	
Diameter Inches	Gauge	Width Inches	Gauge
From 6″ to 18″	No. 26	From 4″ to 12″	No. 26
19″ to 24″	24	13″ to 30″	24
25″ to 39″	22	31″ to 60″	22
40″ to 48″	20	61″ to 100″	20
Over 48″	18	Over 100″	18

All metal duct work should be rigidly constructed and installed. This eliminates chance of vibration. All slip joints should be in the direction of the air flow.

Rectangular ducts should be made with standing seams and braced with angle iron where necessary. When designing an extensive system, it is good practice to gradually lower the velocity both in the main duct and the remote branches. This scheme of design:

1st. Distributes the air uniformly.

2nd. It also decreases the friction in the smaller ducts, where it otherwise would be greatest.

3rd. When the velocity is lowered, there follows a reduction of velocity pressure, thus compensating for the duct friction.

Where fresh air is supplied, some method should be provided for removing the dust and soot, particularly so if the intake is close to the street or alley. There are several compact air filters manufactured which are suitable for this purpose; they are used on the inlet side of the system. Where so used, additional resistance is added and must be allowed for.

Provisions should be made to heat or temper the cold incoming air. Where a blast heating coil is used, this also adds additional resistance to the system and must be considered in calculations. The velocity recommended by the manufacturers of the filters and heating coils should be followed and the attendant friction losses used in the calculations.

Dampers and deflectors should be used sparingly. If the system is designed properly, the use of many dampers will not be necessary.

CHANGING DUCT SIZES

In reducing size or changing shape of a duct, care must be taken that the angle of the slope is not too abrupt.

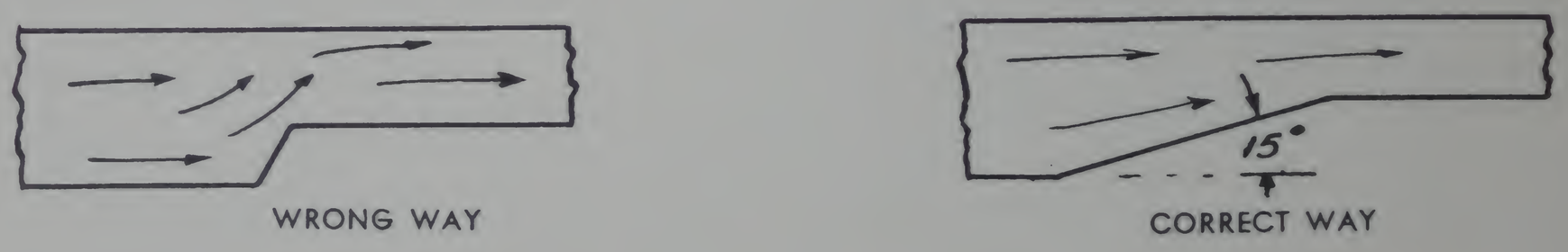


FIGURE 22

From the examples shown in Figure 22, it is seen that any sharp obstructions in the path of the air through ducts greatly increases the restriction and static pressure. This should be borne in mind when designing the system.

The angle of the slope should never be greater than 15 or 20 degrees. Rectangular ducts should be made as square as possible and unless it is absolutely necessary a duct should not be more than four times as wide as it is deep.

ELBOWS

When designing a duct system, great care should be taken in shaping the elbows, as sharp turns add greatly to the friction and lower the efficiency of the entire system. 90° bends should always be made with a center line radius equal to one and a half times the diameter of the duct at point of bend and never should the center line radius be less than the diameter of a duct at point of bend.

The drawings below show four different 90 degree bends. Figure 23 shows a center line radius of one and a half times the diameter; Figure 24, center line radius equal to the diameter; Figure 25, inside throat square; Figure 26, a square 90 degree turn.

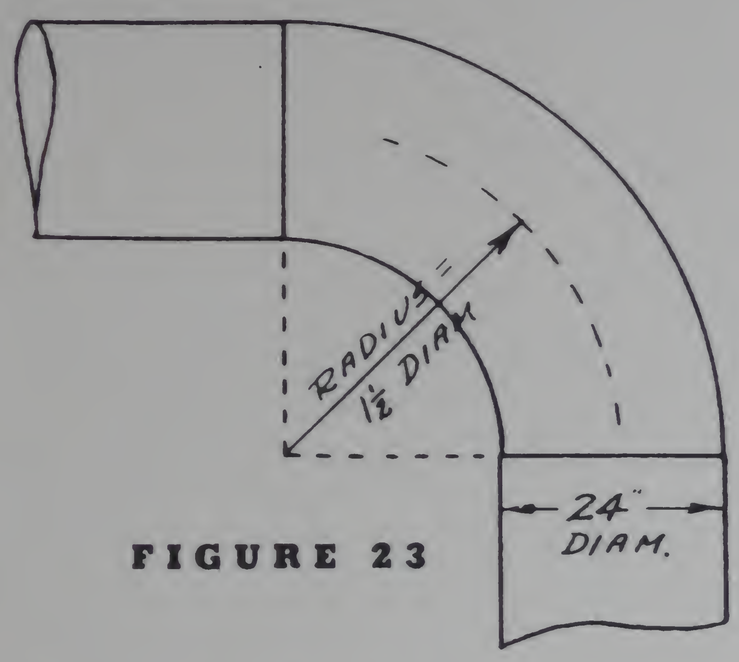


FIGURE 23

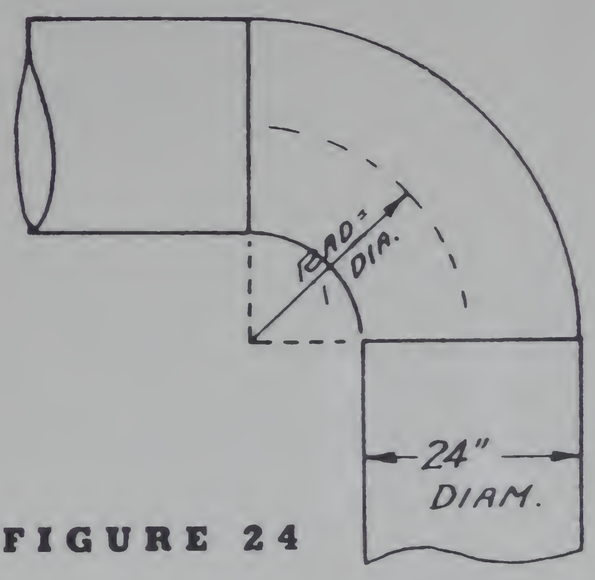


FIGURE 24

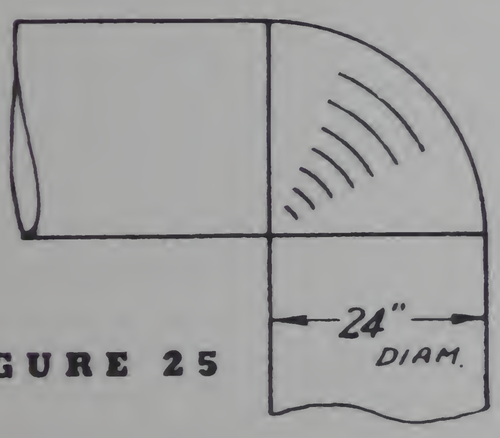


FIGURE 25

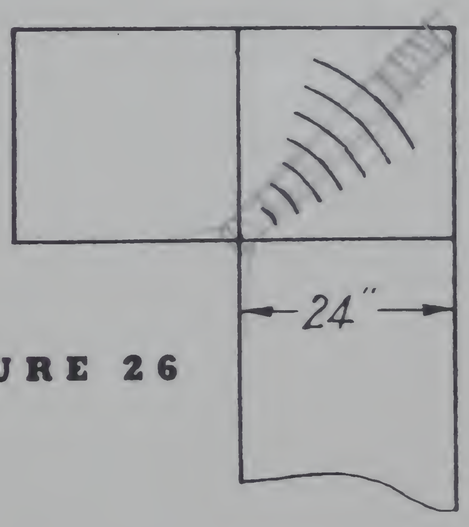


FIGURE 26

A bend similar to Figure 23 should be used wherever possible, although a bend similar to Figure 24 is permissible where available space will not allow a greater sweep. Bends similar to Figures 25 and 26 are not desirable; they should not be used in connection with a duct system unless space conditions require it and then only when turning vanes or splitters are employed.

These vanes channel the air stream uniformly around the bend. Without them, the entire volume of air would hit the outside of the elbow creating congestion and eddy currents resulting in greatly increased resistance to air flow.

HOW TO DESIGN SYSTEMS

I. THE SUPPLY SYSTEM

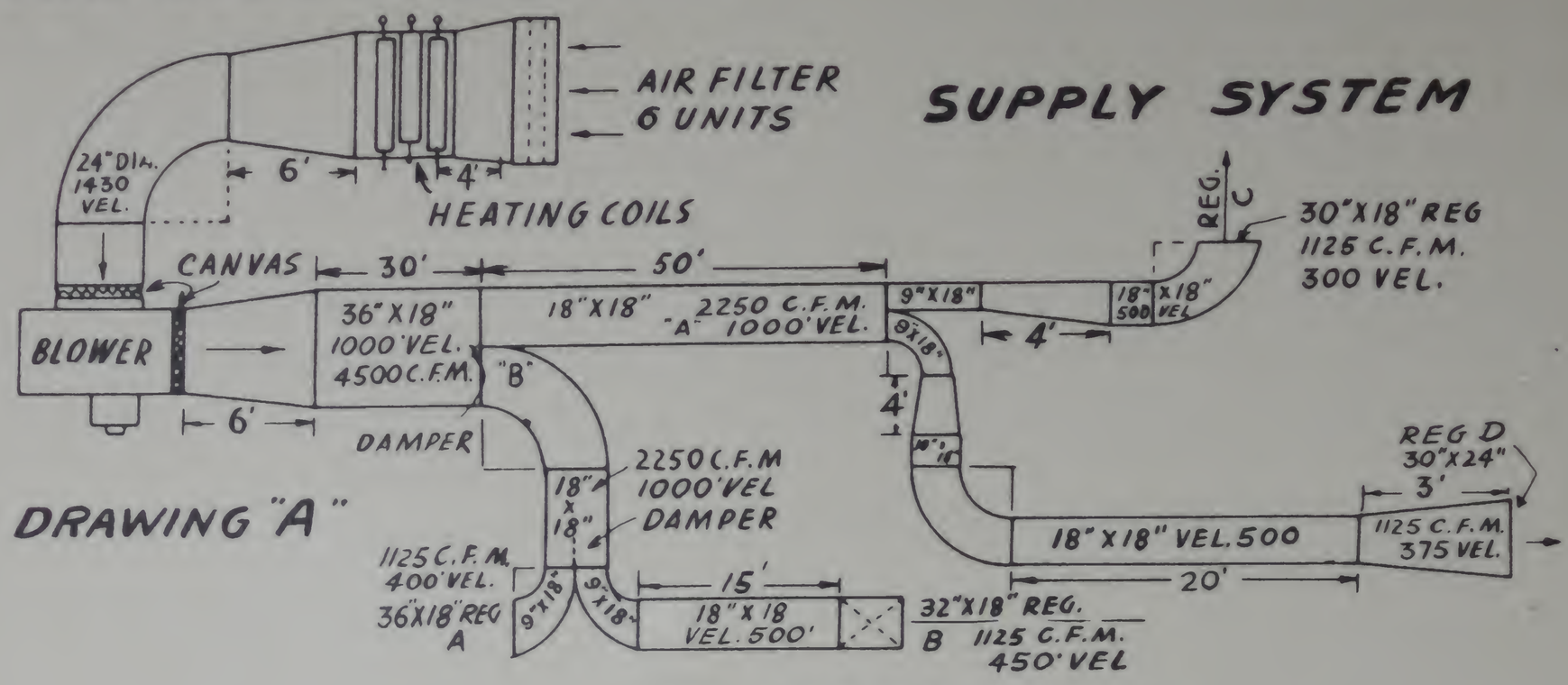


FIGURE 27

Assume that it is necessary to design a quiet air supply system to deliver 4500 CFM, distributing this volume at four points shown in Drawing A, Figure 27, through registers A, B, C, and D.

For the sake of clarity let us begin at the point where the air is drawn into the building. First comes the question of filters, which should be selected on the basis of the manufacturer's recommendations.

Next, heating coils should be selected to temper the air from −10°F to +80°F. (The minimum outside temperature differs in various parts of the country. −10°F is the middle zone minimum.) Transformation pieces should be used from the duct section housing the filters to the section housing the heating coils and from there to the section of the duct entering the inlet of the blower. For 1430 ft. velocity a 24″ round duct can be used at the inlet.

Then, starting from the outlet of the blower, it is necessary to provide for a reduction of the air velocity. As this is a supply system, the main duct velocity should be about 1000 ft. per minute.

Therefore: $\frac{4500 \text{ CFM}}{1000 \text{ Velocity}}$ equals 4½ sq. ft. area for the main duct or 36″ x 18″

See Page 29 for corresponding round or square table.

Assume with this layout it is necessary to divide the main duct equally into two parts. In each branch the velocity remains the same, so the area of each branch will equal one-half of the main duct or 2¼ sq. ft. or 18″ x 18″ and with a 1000 ft. velocity, 2250 CFM will flow through each.

At register A, 1125 CFM is to be delivered with a velocity through register of 400 ft. per minute. This will require a free area of 2.8 sq. ft. in the register. It is obvious that overall area of a register cannot be a net free area. It is good practice to figure free area of a register equal to 50% of overall area. Register A will then be 36″ x 18″, giving a free area of about 2¾ sq. ft., which will be satisfactory.

At register B, 1125 CFM is delivered at a velocity of 450 ft. per minute and by following the same procedure at register A, it is found necessary to use a register 32″ x 18″. This register is placed in the bottom of the duct and discharges the air to the floor. In the branch duct leading to the register B, the velocity has been dropped to 500 ft. per minute, to provide for a uniform register velocity.

At register C, again the same procedure is followed as at register A. In this example, registers A and C discharge from branch ducts in like manner, and care should be taken in similar cases to proportion each register box with a graceful expanding scroll, in order that velocity will be reduced evenly.

At register D, which is most remote from the blower, the required air velocity through the register is 375 ft. per minute, and therefore, the size will be 30″ x 24″.

The branch duct leading to this register is 18″ x 18″, enlarged from 9″ x 19″, giving a velocity of 500 ft. per minute or about one-half the main duct velocity.

II. THE EXHAUST SYSTEM

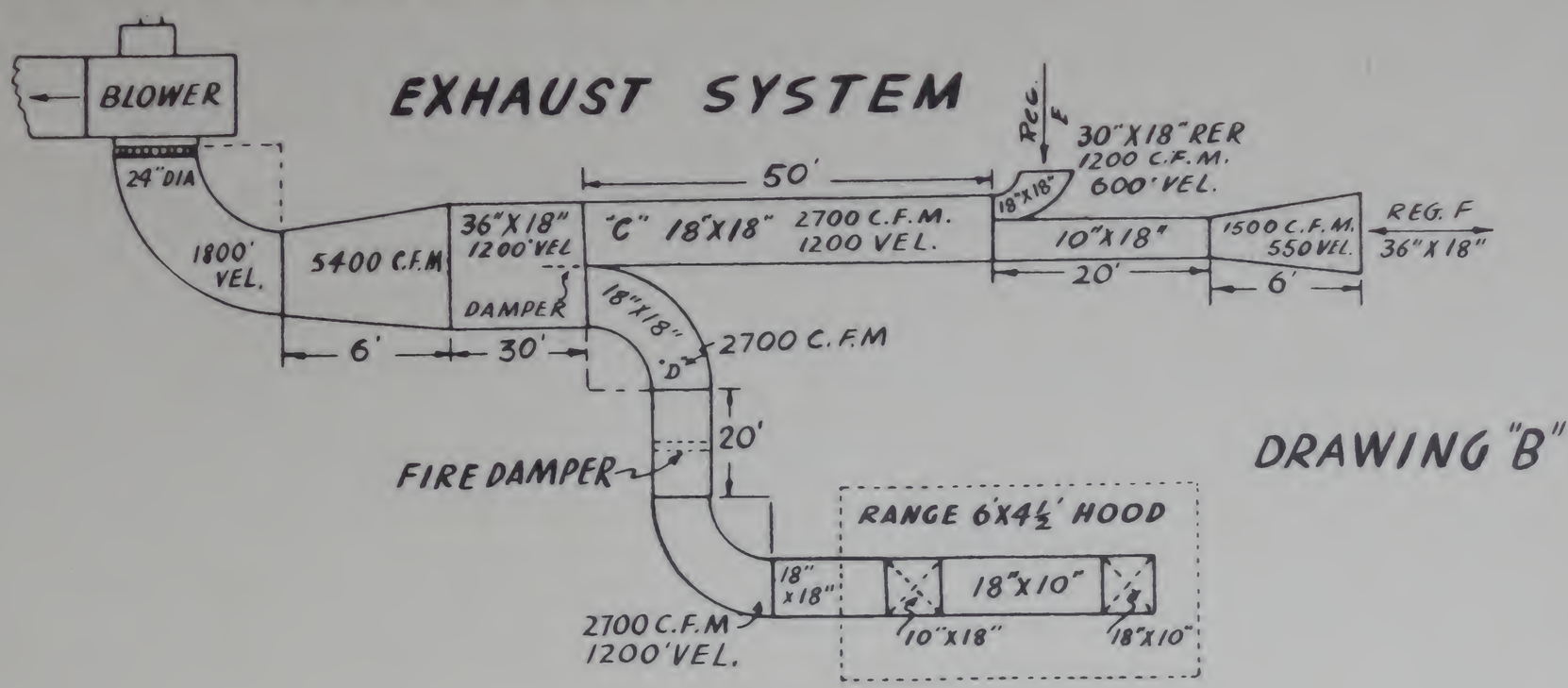


FIGURE 28

Proportioning ducts for an EXHAUST system, the same procedure will be followed as described under supply systems, with the exception that the duct and register velocities may be higher.

Drawing B, Figure 28, shows a general scheme for designing an exhaust system, exhausting 5400 CFM in a restaurant kitchen. From the inlet, the duct is enlarged to 36″ x 18″, in order to allow a main duct velocity of 1200 ft. per minute. Branch duct C goes to two points marked registers E. and F. At register E, the allowable velocity is 600 ft. and the register size is found, as described, to be 30″ x 18″ (volume 1200 CFM at 550 ft. velocity). The total CFM pulled through the two registers equals 2700 CFM. This volume moved at a 1200 ft. velocity will require a duct 19″ x 18″ as shown. The other half of the main duct marked D goes to a kitchen range hood.

With a recommended hood velocity of 100 CFM per sq. ft. of hood area,* a 27 sq. ft. hood will be required, such as 6 ft. by 4½ ft. or equivalent. At a velocity of 1200 ft. per minute, the duct will also be 18″ x 18″ as shown on the drawing. This duct connects to the hood and the two openings are provided through the top of the hood. In the case of longer hoods, it is good practice to provide openings on four or five foot centers.

All ducts leading from a range hood should be of heavy metal and when installed near the ceiling or through floors in a non-fireproof building, the ducts should be covered with asbestos. In any event, a double fusible link fire damper should be provided in the duct near the range hood. This fire damper should be made of heavy metal suspended against the air flow, held by a chain and two fusible links, one link on the inside of the duct and one on the outside.

The grease in a range hood frequently catches on fire and if the damper is properly installed the heat will cause one of the fusible links to melt and the suction of the fan will quickly close the damper against the stops, thus preventing the fire from spreading to the rest of the system. All ducts leading from the kitchen range hoods and the like should be provided with clean-out doors, making it possible to clean the inside of the ducts at definite intervals.

Near the inlet of each blower or exhauster, a door of ample size should always be provided in the duct, making it possible for a mechanic to inspect the wheel or remove the key and set screws holding the wheel to the motor shaft, if at any time it should become necessary to remove the motor.

The schematic drawings, Figrues 27 and 28, show how these systems should be proportioned. Larger and more extensive systems can be designed in the same manner, by merely repeating the basic methods described above.

*See page 27.

All branch ducts should connect to the main duct with easy bends, as shown; that is, with a center line radius equal to one and a half times the diameter or one diameter.

Ordinarily, the air velocity in a branch duct is equal to or lower than the velocity in the main duct and never should the branch duct velocity be greater than the main duct velocity.

FIGURING FRICTION LOSS OF SYSTEM

To determine the friction loss of any system, it is necessary to know the velocity and size of duct. The friction loss per hundred feet of duct will be found in the table on Page 31.

Allowance must also be made for elbows or bends by adding five diameters for a round elbow and eight for a square or rectangular elbow to the total length of the duct. This drawing will be used as an example.

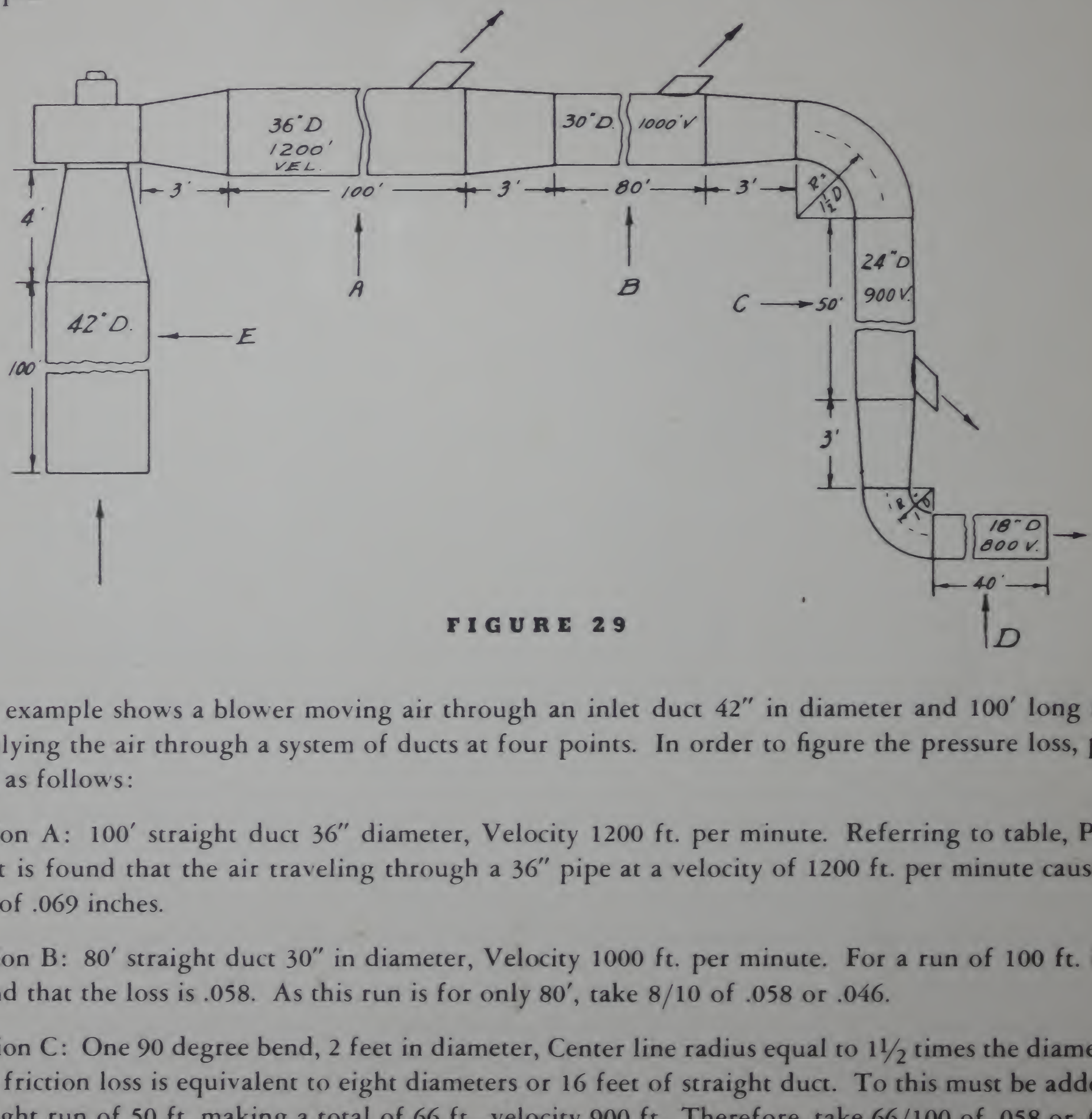


FIGURE 29

This example shows a blower moving air through an inlet duct 42″ in diameter and 100′ long and supplying the air through a system of ducts at four points. In order to figure the pressure loss, proceed as follows:

Section A: 100′ straight duct 36″ diameter, Velocity 1200 ft. per minute. Referring to table, Page 31, it is found that the air traveling through a 36″ pipe at a velocity of 1200 ft. per minute causes a loss of .069 inches.

Section B: 80′ straight duct 30″ in diameter, Velocity 1000 ft. per minute. For a run of 100 ft. it is found that the loss is .058. As this run is for only 80′, take 8/10 of .058 or .046.

Section C: One 90 degree bend, 2 feet in diameter, Center line radius equal to 1½ times the diameter. The friction loss is equivalent to eight diameters or 16 feet of straight duct. To this must be added a straight run of 50 ft. making a total of 66 ft., velocity 900 ft. Therefore, take 66/100 of .058 or .037.

Section D: In this section, there is one 90 degree bend and in this section the duct is 18″ in diameter. The friction loss is equal to eight diameters or 12 feet of straight pipe. Add to this the straight run of 40 ft. or a total of 52 ft. Therefore, take 52/100 of .060 and the result is .031.

Inlet duct Section E: This duct is 100′ long, and 42″ in diameter. With air traveling through at a velocity of 1000 ft. per minute, it is found that the pressure loss is .041.

In order to find the total friction losses, add the loss in each section; that is, A-B-C-D-E and the total loss is .224. In this case, the blower to be selected would be the one to deliver the required volume at 1/4″ static pressure.

The above example is based on round ducts, but if the ducts are to be rectangular in shape instead of round, it would only be necessary to reduce the rectangular ducts to round ducts of equivalent area, see Page 29, and proceed with the calculations as described above.

In a more extensive duct system, where there are one or more branches, it is only necessary to figure the pressure loss in the longest main duct and branch duct, omitting the loss in the shorter branches.

In the event heaters, air filters, and air washers are used in connection with the blower, an additional resistance is built up and this will have to be taken into consideration before selecting the blower.

HOOD AND CANOPY INFORMATION

There are numerous types of installations requiring the use of a canopy or hood, or the connection to same, and the following formula should be used to obtain satisfactory results.

For restaurants where the hood is directly over the range, figure 100 CFM for every square foot of hood area. A hood 4′ wide by 6′ long would have an area of 24 square feet. Therefore, if 100 CFM is desired for each square foot of hood area, the result will be 2400 CFM.

The above figure is based for kitchen range, where smoke and steam from cooking are generated at a rapid rate. For other processes a smaller CFM per square foot of hood surface will be satisfactory.

Some installations using hoods in connection with their processes, generate steam, odors, etc. at such a rapid rate that it would be impossible for the blower to catch all of them unless the velocity were increased tremendously. This would necessitate a larger blower which may not be practical.

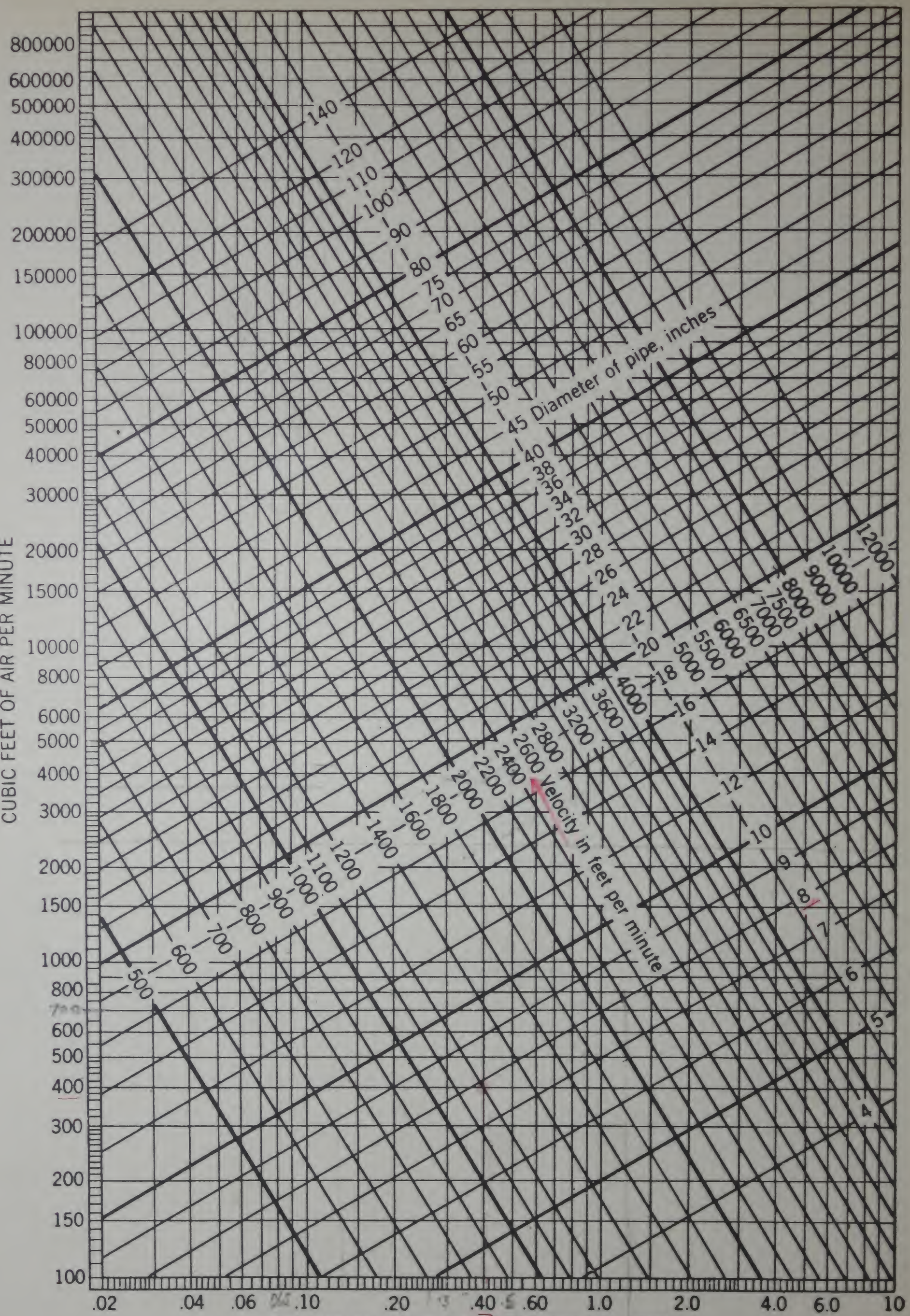
This objection can be overcome by the installation of aprons on three sides of the hood or canopy, and are usually so hinged that the aprons can be swung up out of the way if necessary.

Use of these aprons has the effect of increasing the air velocity by reducing the space between the hood and the table.

Some processes may have to have the front side also closed in. Wherever the need of these aprons is necessary, care should be taken that they do not fit too tightly over the kettle or vats. A space all around so as to maintain a high velocity should be allowed.

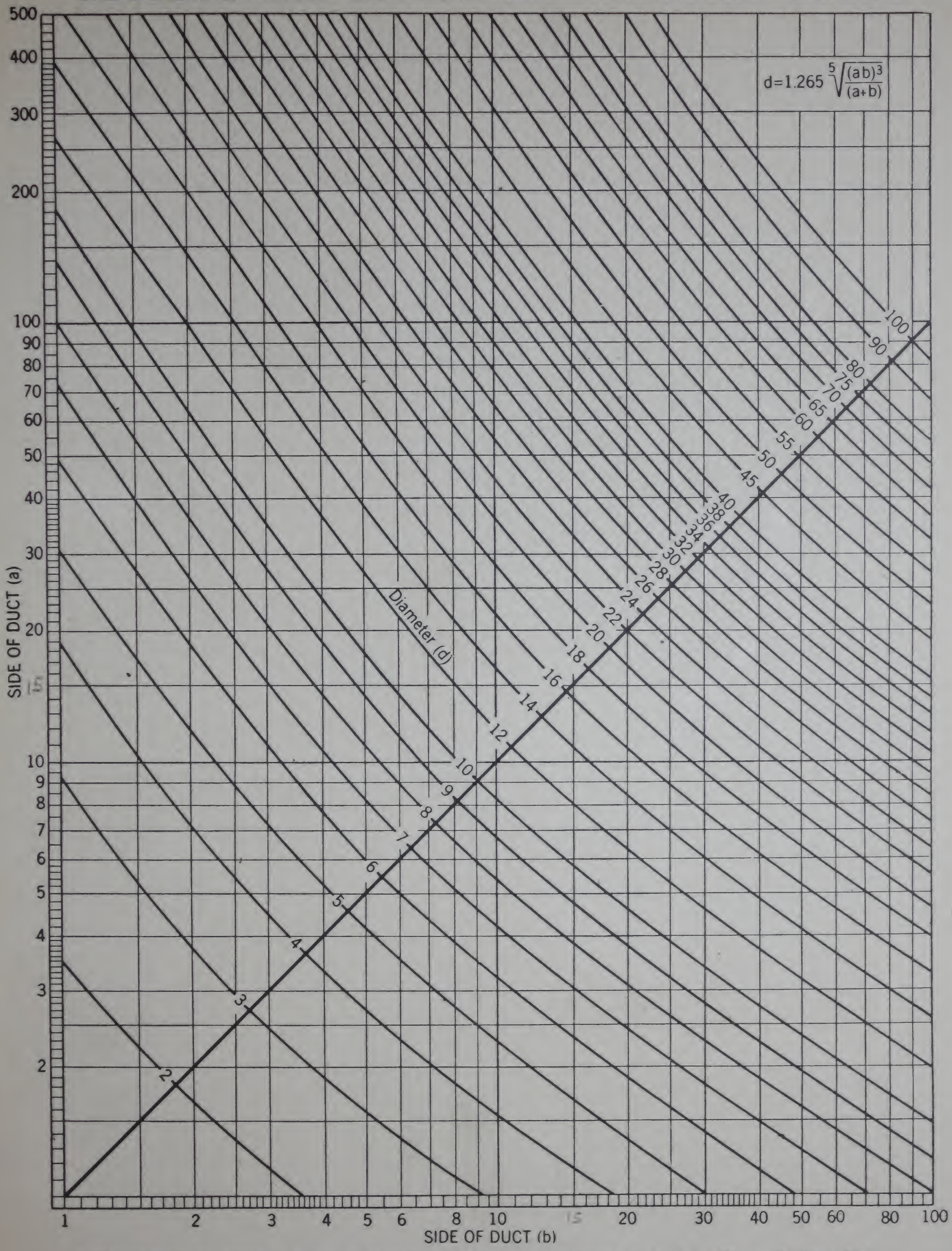
Where hoods are long, it is desirable to pull air through from more than one point. Ordinarily a duct connection for each five feet of hood will give good results.

FRICTION OF AIR IN PIPE



Reprinted from the American Society of Heating and Ventilating Engineers Guide 1941, Chapter 31, Page 574.

RECTANGULAR EQUIVALENT OF ROUND DUCTS



Reprinted from the American Society of Heating and Ventilating Engineers Guide 1941, Chapter 31, Page 575.

AREAS AND CIRCUMFERENCES OF CIRCLES AND THE SIDES OF SQUARES OF THE SAME AREA

Diameter in Inches	Area of Circle in Square Feet	Area of Circle in Square Inches	Sides of Squares of Same Area in Inches	Circumference of Circle in Inches	Diameter in Inches	Area of Circle in Square Feet	Area of Circle in Square Inches	Sides of Squares of Same Area in Inches	Circumference of Circle in Inches	Diameter in Inches	Area of Circle in Square Feet	Area of Circle in Square Inches	Sides of Squares of Same Area in Inches	Circumference of Circle in Inches	Diameter in Inches	Area of Circle in Square Feet	Area of Circle in Square Inches	Sides of Squares of Same Area in Inches	Circumference of Circle in Inches
1	.005	.8	.9	3.1	16½	1.48	213.8	14.6	51.8	32	5.58	804.2	28.3	100.5	47½	12.31	1772.0	42.1	149.2
1½	.012	1.7	1.3	4.7	17	1.58	226.9	15.0	53.4	32½	5.75	829.5	28.8	102.1	48	12.55	1809.5	42.5	150.7
2	.022	3.1	1.7	6.2	17½	1.67	240.5	15.5	54.9	33	5.93	855.3	29.2	103.6	48½	12.85	1847.4	42.9	152.3
2½	.034	4.9	2.2	7.8	18	1.77	254.4	15.9	56.5	33½	6.11	881.4	29.6	105.2	49	13.10	1885.7	43.4	153.9
3	.049	7.0	2.6	9.4	18½	1.87	268.8	16.4	58.1	34	6.31	907.9	30.1	106.8	49½	13.40	1924.4	43.8	155.5
3½	.067	9.6	3.1	10.9	19	1.97	283.5	16.8	59.6	34½	6.47	934.8	30.5	108.3	50	13.65	1963.5	44.3	157.0
4	.087	12.5	3.5	12.5	19½	2.07	298.6	17.2	61.2	35	6.67	962.1	31.0	109.9	50½	13.95	2002.9	44.7	158.6
4½	.110	15.9	3.9	14.1	20	2.18	314.1	17.7	62.8	35½	6.87	989.8	31.4	111.5	51	14.20	2042.8	45.2	160.2
5	.136	19.6	4.4	15.7	20½	2.29	330.0	18.1	64.4	36	7.08	1017.8	31.9	113.0	51½	14.45	2083.0	45.6	161.7
5½	.165	23.7	4.8	17.2	21	2.41	346.3	18.6	65.9	36½	7.28	1046.3	32.3	114.6	52	14.75	2123.7	46.0	163.3
6	.196	28.2	5.3	18.8	21½	2.52	363.0	19.0	67.5	37	7.46	1075.2	32.7	116.2	52½	15.05	2164.7	46.5	164.9
6½	.230	33.1	5.7	20.4	22	2.64	380.1	19.5	69.1	37½	7.69	1104.4	33.2	117.8	53	15.35	2206.1	46.9	166.5
7	.268	38.4	6.2	21.9	22½	2.76	397.6	19.9	70.6	38	7.88	1134.1	33.6	119.3	53½	15.62	2248.0	47.4	168.0
7½	.306	44.1	6.6	23.5	23	2.84	415.4	20.3	72.2	38½	8.10	1164.1	34.1	120.9	54	15.92	2290.2	47.8	169.6
8	.350	50.2	7.0	25.1	23½	3.01	433.7	20.8	73.8	39	8.30	1194.5	34.5	122.5	54½	16.20	2332.8	48.3	171.2
8½	.393	56.7	7.5	26.7	24	3.14	452.3	21.2	75.3	39½	8.52	1225.4	35.0	124.0	55	16.45	2375.8	48.7	172.7
9	.442	63.6	7.9	28.2	24½	3.28	471.4	21.7	76.9	40	8.72	1256.6	35.4	125.6	55½	16.80	2419.2	49.1	174.3
9½	.493	70.8	8.4	29.8	25	3.41	490.8	22.1	78.5	40½	8.95	1288.2	35.8	127.2	56	17.10	2463.0	49.6	175.9
10	.545	78.5	8.8	31.4	25½	3.54	510.7	22.6	80.1	41	9.17	1320.2	36.3	128.8	56½	17.45	2507.1	50.0	177.5
10½	.600	86.5	9.3	32.9	26	3.69	530.9	23.0	81.6	41½	9.40	1352.6	36.8	130.3	57	17.72	2551.7	50.5	179.0
11	.660	95.0	9.7	34.5	26½	3.83	551.5	23.4	83.2	42	9.64	1385.4	37.2	131.9	57½	18.00	2596.7	50.9	180.6
11½	.722	103.8	10.1	36.1	27	3.98	572.5	23.9	84.8	42½	9.85	1418.6	37.6	133.5	58	18.35	2642.0	51.4	182.2
12	.785	113.1	10.6	37.6	27½	4.13	593.9	24.3	86.3	43	10.10	1452.2	38.1	135.0	58½	18.65	2687.8	51.8	183.7
12½	.852	122.7	11.0	39.2	28	4.28	615.7	24.8	87.9	43½	10.31	1486.1	38.5	136.6	59	18.95	2733.9	52.2	185.3
13	.922	132.7	11.5	40.8	28½	4.42	637.9	25.2	89.5	44	10.55	1520.5	38.9	138.2	59½	19.35	2780.5	52.7	186.9
13½	.994	143.1	11.9	42.4	29	4.59	660.5	25.7	91.1	44½	10.80	1555.2	39.4	139.8	60	19.65	2827.7	53.1	188.4
14	1.07	153.9	12.4	43.9	29½	4.74	683.4	26.1	92.6	45	11.05	1590.4	39.8	141.3	60½	19.95	2874.7	53.6	190.0
14½	1.15	165.1	12.8	45.5	30	4.92	706.8	26.5	94.2	45½	11.30	1625.9	40.3	142.9	61	20.39	2922.5	54.0	191.6
15	1.23	176.7	13.2	47.1	30½	5.07	730.6	27.0	95.8	46	11.55	1661.9	40.7	144.5	61½	20.62	2970.6	54.5	193.2
15½	1.31	188.6	13.7	48.6	31	5.23	754.7	27.4	97.3	46½	11.80	1698.2	41.2	146.0	62	20.95	3019.1	54.9	194.8
16	1.40	201.0	14.1	50.2	31½	5.42	779.3	27.9	98.9	47	12.10	1734.9	41.6	147.6	62½	21.32	3068.0	55.4	196.4

Diam. of pipe in inches	Area in sq. inches	PRESSURE LOSS IN INCHES OF WATER, DUE TO FRICTION OF AIR, PER 100 FT. OF PIPE — VELOCITY OF AIR IN FEET PER MINUTE														
		200	400	600	800	900	1000	1200	1400	1600	1800	2000	2400	3000	4500	6000
3	7.0	.023	.092	.208	.370	.468	.581	.832	1.14	1.48	1.87	2.32	3.33	5.20	11.70	20.80
4	12.5	.017	.070	.157	.280	.350	.440	.624	.862	1.12	1.40	1.76	2.50	3.94	8.85	15.76
5	19.6	.014	.056	.125	.226	.281	.348	.498	.721	.902	1.12	1.39	1.99	3.12	7.03	12.48
6	28.2	.011	.046	.104	.185	.234	.290	.417	.568	.741	.935	1.16	1.67	2.60	5.84	10.40
7	38.4	.010	.040	.089	.158	.201	.249	.357	.487	.633	.805	1.00	1.43	2.22	5.01	8.88
8	50.2	.009	.034	.078	.138	.176	.218	.312	.427	.554	.703	.872	1.25	1.95	4.38	7.80
9	63.6	.008	.031	.069	.123	.156	.194	.277	.379	.493	.625	.776	1.11	1.73	3.89	6.92
10	78.5	.007	.028	.063	.111	.141	.175	.250	.342	.445	.562	.700	1.00	1.56	3.51	6.24
12	113.1	.006	.023	.052	.092	.117	.145	.208	.284	.369	.467	.580	.832	1.30	2.92	5.20
14	153.9	.005	.021	.049	.086	.109	.136	.194	.266	.345	.437	.544	.776	1.21	2.74	4.84
16	201.0	.004	.017	.039	.070	.088	.109	.156	.214	.278	.352	.436	.624	.977	2.20	3.91
18	254.4	.004	.015	.035	.060	.078	.097	.138	.190	.242	.312	.387	.552	.867	1.95	3.47
20	314.1	.004	.014	.031	.055	.070	.087	.124	.170	.221	.280	.348	.496	.778	1.75	3.11
22	380.1	.003	.013	.028	.050	.064	.079	.113	.156	.202	.256	.317	.452	.711	1.60	2.84
24	452.3	.003	.012	.026	.046	.058	.073	.104	.142	.164	.234	.290	.416	.650	1.46	2.60
28	615.7	.003	.010	.022	.040	.052	.062	.089	.122	.159	.202	.249	.356	.558	1.26	2.23
30	706.8	.003	.009	.020	.037	.047	.058	.083	.114	.148	.187	.232	.332	.520	1.17	2.08
36	1017	.002	.008	.017	.031	.039	.048	.069	.095	.123	.156	.193	.276	.433	.976	1.73
42	1385	.002	.007	.015	.026	.033	.041	.059	.081	.106	.134	.166	.236	.371	.836	1.48
48	1809	.002	.006	.013	.023	.029	.036	.052	.071	.092	.117	.144	.208	.325	.731	1.30
54	2290	.001	.005	.012	.020	.026	.032	.046	.063	.082	.104	.129	.184	.288	.650	1.15
60	2827	.001	.005	.010	.018	.023	.029	.042	.057	.074	.094	.116	.168	.260	.585	1.04

NOTE:—For other lengths of pipe the loss is directly proportional to the length.

DECIMAL EQUIVALENTS

	1/64	0.015625		33/64	0.515625
1/32		.03125	17/32		.53125
	3/64	.046875		35/64	.546875
1/16		.0625	9/16		.5625
	5/64	.078125		37/64	.578125
3/32		.09375	19/32		.59375
	7/64	.109375		39/64	.609375
1/8		.125	5/8		.625
	9/64	.140625		41/64	.640625
5/32		.15625	21/32		.65625
	11/64	.171875		43/64	.671875
3/16		.1875	11/16		.6875
	13/64	.203125		45/64	.703125
7/32		.21875	23/32		.71875
	15/64	.234375		47/64	.734375
1/4		.250	3/4		.750
	17/64	.265625		49/64	.765625
9/32		.28125	25/32		.78125
	19/64	.296875		51/64	.796875
5/16		.3125	13/16		.8125
	21/64	.328125		53/64	.828125
11/32		.34375	27/32		.84375
	23/64	.359375		55/64	.859375
3/8		.375	7/8		.875
	25/64	.390625		57/64	.890625
13/32		.40625	29/32		.90625
	27/64	.42187		59/64	.921875
7/16		.4375	15/16		.9375
	29/64	.453125		61/64	.953125
15/32		.46875	31/32		.96875
	31/64	.484375		63/64	.98437
1/2		.500	1		1.0

INDEX TO INSTALLATIONS

Convenience in your use of the "ILG-BOOK" has been increased by the use of the indexing system shown at right. As you fan through the body of the book, note the black rectangles which have been placed at the edge of each page. These rectangles have been positioned to correspond with the index guide reproduced here and on Page 30, thus simplifying your selection of the type of installation in which you are interested.

"Sensible" Ventilation

For more than 35 years, the ILG Electric Ventilating Co. has demonstrated a pioneering spirit. Rather than accept, without question, practices and rules which have guided the ventilating industry, ILG has constantly sought better methods of engineering. The results of this constant search for more effective methods have come to be known as "Sensible" Ventilation, meaning "in a sensible manner with intelligence or good sense". And the installations which follow indicate how "Sensible" Ventilation may be applied to all types and sizes of buildings, to a wide variety of problems. Here are some of the cardinal principles of "Sensible" Ventilation:

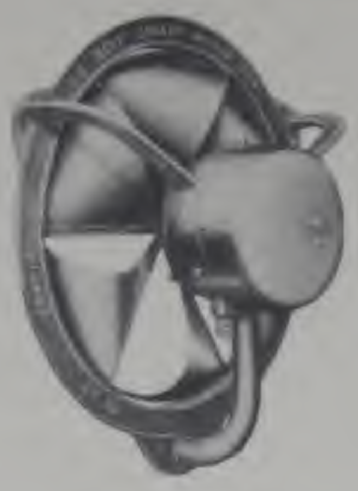
ECONOMY OF INSTALLATION—Too often ventilating systems are designed by manufacturers' representatives who either do not have the proper engineering background, or deliberately design systems around the particular type of equipment they have to sell, without regard for original cost, operating cost, or maintenance cost.

Again, certain engineers insist that a building can be properly ventilated only with an elaborate system of ducts, sometimes both on supply and exhaust. It is true that in many cases ducts are absolutely necessary, but the point is that they are *not* necessary on *every* job and very often an analysis will show that propeller fans in penthouses or in an outside wall, with openings close to the flow for fresh air supply, will do the job equally well. Often the only problem involved is to get air exhausted from the building and allow sufficient air inlet to replace that exhausted. In most cases, normal building openings provide necessary air inlets.

FANS OR BLOWERS—Some designers of ventilating systems always specify centrifugal blowers, even though there is no problem of static pressure involved. As ILG makes *both* blowers and fans, company engineers can be completely impartial in making recommendations. It is known, for instance, that centrifugal blowers, irrespective of make, require more watts per CFM than propeller fans. Centrifugal blowers are more efficient against high pressures, while propeller fans are more efficient against low pressures. Therefore, when blowers are unnecessarily used, not only is the original cost increased, but electricity is wasted every operating hour.

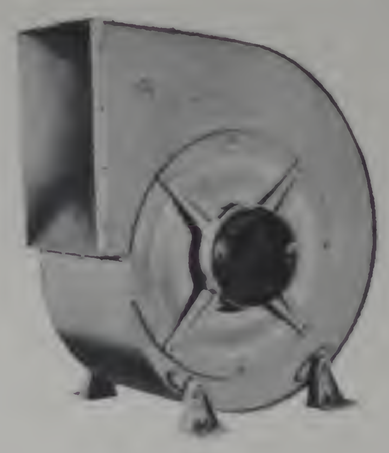
(Continued on Page 35)

"KEY" TO ILG PRODUCTS MENTIONED IN FOLLOWING INSTALLATIONS



ILG SELF-COOLED MOTOR PROPELLER FANS

Supremely quiet . . . smooth and effortless operation . . . dynamically balanced . . . rugged, heavy-duty frame . . . reduced operating and maintenance costs . . . exceptionally long life . . . "One-Name-Plate" Guarantee. 8" to 72".

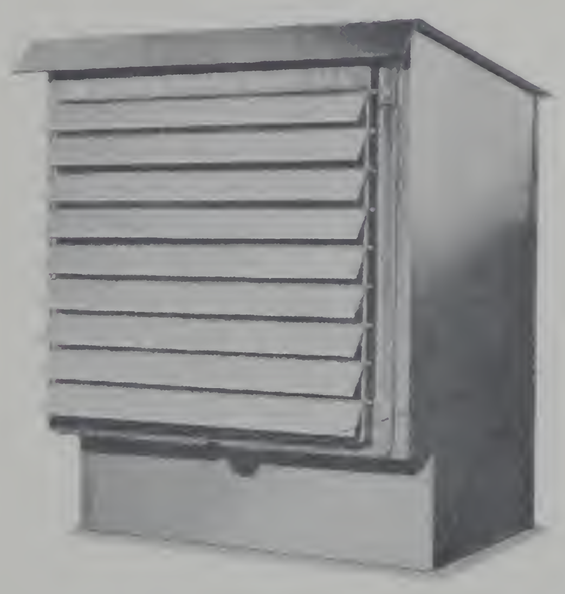


ILG DIRECT-CONNECTED UNIVERSAL BLOWERS

Engineered as a balanced, integral unit (including all-ILG-built motor) instead of mere assembly of parts . . . wide variety of types and sizes . . . rugged construction . . . quiet operation . . . Belted blowers also available.

ILG "VITAL ZONE" UNIT HEATERS

With self-cooled motor that "breathes" (never "slow roasts") . . . horizontal, vertical, low-ceiling, or textile types . . . wide range of sizes and capacities . . . steam or hot water . . . also self-contained electric and gas-fired units.



ILG POWER ROOF VENTILATORS

Consists of Self-Cooled Motor Propeller Fan . . . in weather-tight, galvanized steel penthouse . . . with ILG Automatic Shutter to avoid motor overloading and to protect interior of building. Also available with "Blackout" Hood.

ILG NIGHT-COOLING FANS

Made in sizes and styles for homes, apartments, stores, offices, etc. . . . direct-connected . . . quiet . . . modern styling . . . adjustable height standard . . . two-speed motor . . . large capacity . . . "One-Name-Plate" Guarantee.

TYPE "B" TYPE "P" VOLUME BLOWERS

TYPE "B"—for all types of blow-in or exhaust duty where low pressure, small volume, quiet operation are required. 12 capacities—180 to 2100 CFM.

TYPE "P"—for handling small quantities of air over a pressure range of ½" to 3". For removal of dust, fumes, steam, and vapors. 7 capacities.

ILG FILTER-TYPE ILGAIRATORS

Removes over 98% of dust, soot, and plant pollens from entering air . . . mounts in sliding sash window . . . adjustable air volume . . . "No-Draft" grille . . . exceptionally quiet . . . "One-Name-Plate" Guarantee.

ILG KITCHEN VENTILATORS

Exhaust cooking odors, heat, smoke, and fumes at their source . . . prevent "greasy grime" from penetrating other rooms and depositing on curtains, woodwork, walls, and furnishings . . . remove stale air, cigar and cigarette smoke from adjoining rooms . . . eleven different models for permanent or temporary installations . . . "One-Name-Plate" Guarantee.

"BUILT-IN" TYPE

INDEX TO INSTALLATIONS

(CONTINUED)

DIRECT-CONNECTION—Belted fans and blowers, in most cases, lead to costly inefficiencies. There is no question about the noise and money-wasting friction resulting from reduction of motor speed through belts, pulleys, etc., which can be eliminated through direct-connection of motor and wheel. Every designer appreciates the saving in space accruing from the compact arrangement of direct-connected units . . . the flexibility of mounting direct-connected blowers on floor, wall, or ceiling. Installers find it much simpler to roll or suspend a factory-assembled and tested unit into place without time-consuming mounting, aligning and adjusting operations . . . without need for purchasing supplementary belts, pulleys, guards, etc. The man who pays the bills will note the reduction in costs made by direct-connected units which have nothing to get out of alignment, or wear excessively . . . no belts or pulleys to be replaced . . . no daily waste of electricity from indirect transfer of power . . . no need for constant replacement, adjustment and dressing of belts.

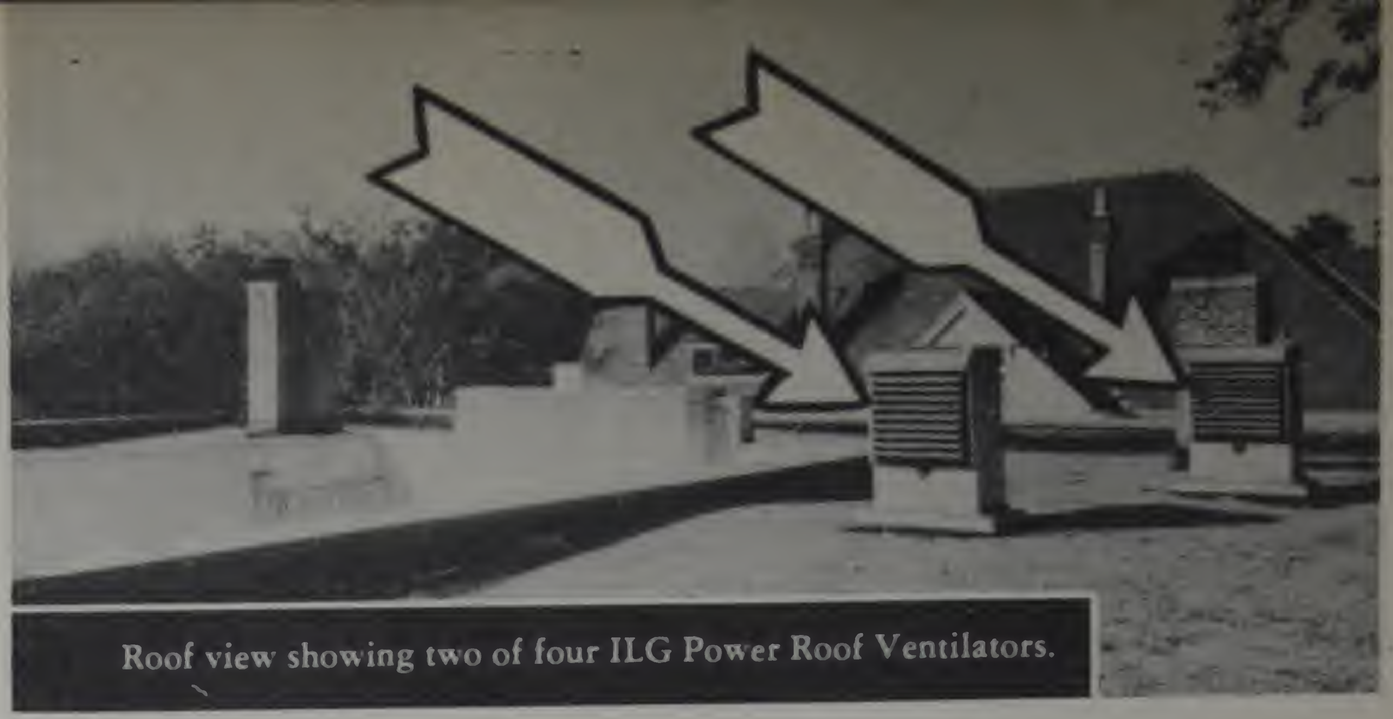
Finally, the safety engineer finds direct-connected units less hazardous as potential sources of accidents or fires. Guards required on belted apparatus often cover only the top and one side of the belts and are not "fool-proof". In event of fire from belts, the guards are not sufficient to prevent the fire from spreading, increasing the possible damage.

The greatest single reason for specifying belted equipment—to make possible a change in belts and drives should there be error in calculating the pressure losses on systems—has been proven to be an unfounded fear. Most engineers know how to figure losses on a ventilating system closely enough to make changing of belts or drives unnecessary. If they don't, the only safe procedure is to use a motor large enough to handle the additional horse-power required from increasing the speed of the fan or blower. If this *isn't* done and an error occurred, not only the belts and drives will have to be changed, but the motor as well. On the other hand, if the larger motor is installed to permit correction of such errors, and pressures have been estimated correctly, the fan or blower will operate for years on end using double or triple the power actually required.

EXAMPLES—The variety of installations shown on the following pages present definite proof that following the cardinal principles of "Sensible" Ventilation makes possible complete satisfaction all along the line from designer, through installation, to the eventual owner. In addition to correctly solving problems, costs are reduced in installation, operation, and maintenance.

LIBRARIES
MEDICAL
OFFICES
PRINTERS & ENGRAVERS
RECREATION CENTERS
RESIDENTIAL
RESTAURANTS
SCHOOLS
STORES
UTILITIES

Interior of upper apartment. Note grille in ceiling.



Roof view showing two of four ILG Power Roof Ventilators.

Exterior of attractive, modern Farnsworth apartments.

PROBLEM: Uncomfortably warm during the long New Orleans summer were the second floor apartments in the Farnsworth Apartments, 5355 St. Charles Avenue. Difficulty was experienced by the owners in getting and retaining tenants in otherwise modern and well appointed living quarters.

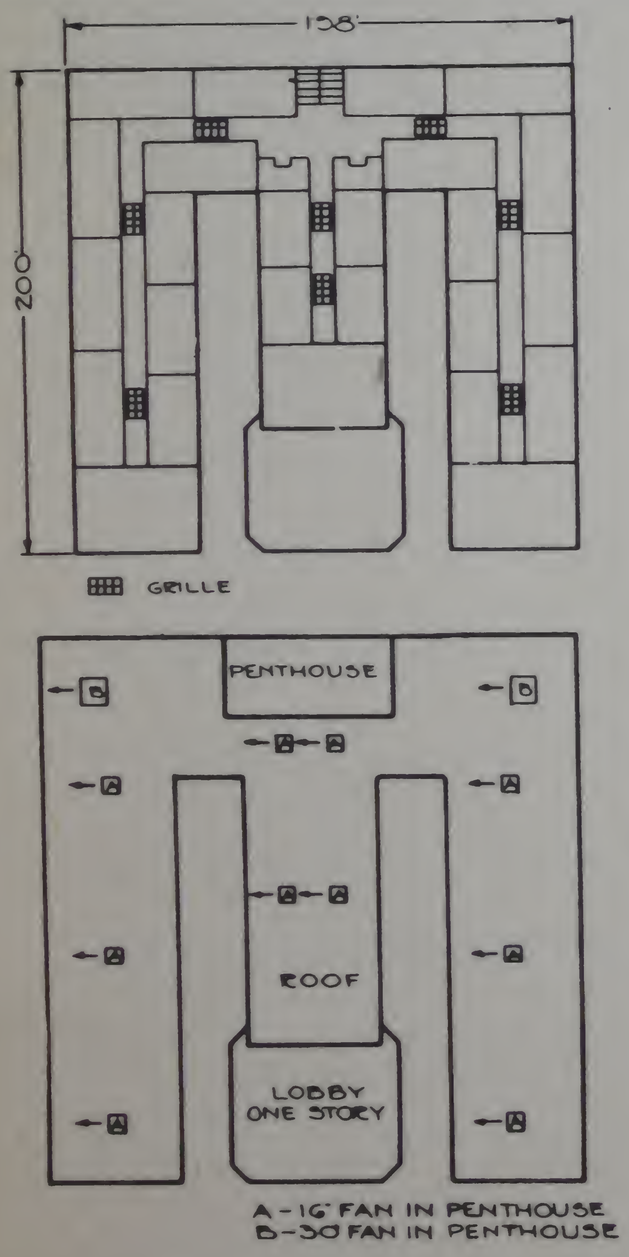
SOLUTION: Four 30" ILG Power Roof Ventilators (Self-Cooled Motor Propeller Fans with Automatic Shutters in Penthouses) were installed on the roof, with each unit drawing from a separate attic over each second floor apartment. There is no connection between the four attics, thus each tenant may run his fan independently. The air change is rapid enough to cause a noticeable air movement which becomes a perceptible breeze when concentrated in one or two rooms.

RESULTS: Tenants are highly pleased as their apartments change from being uncomfortably warm to delightfully cool. The management expresses complete satisfaction.

Roof view showing location of four ILG Power Roof Ventilators.

APARTMENT HOTELS

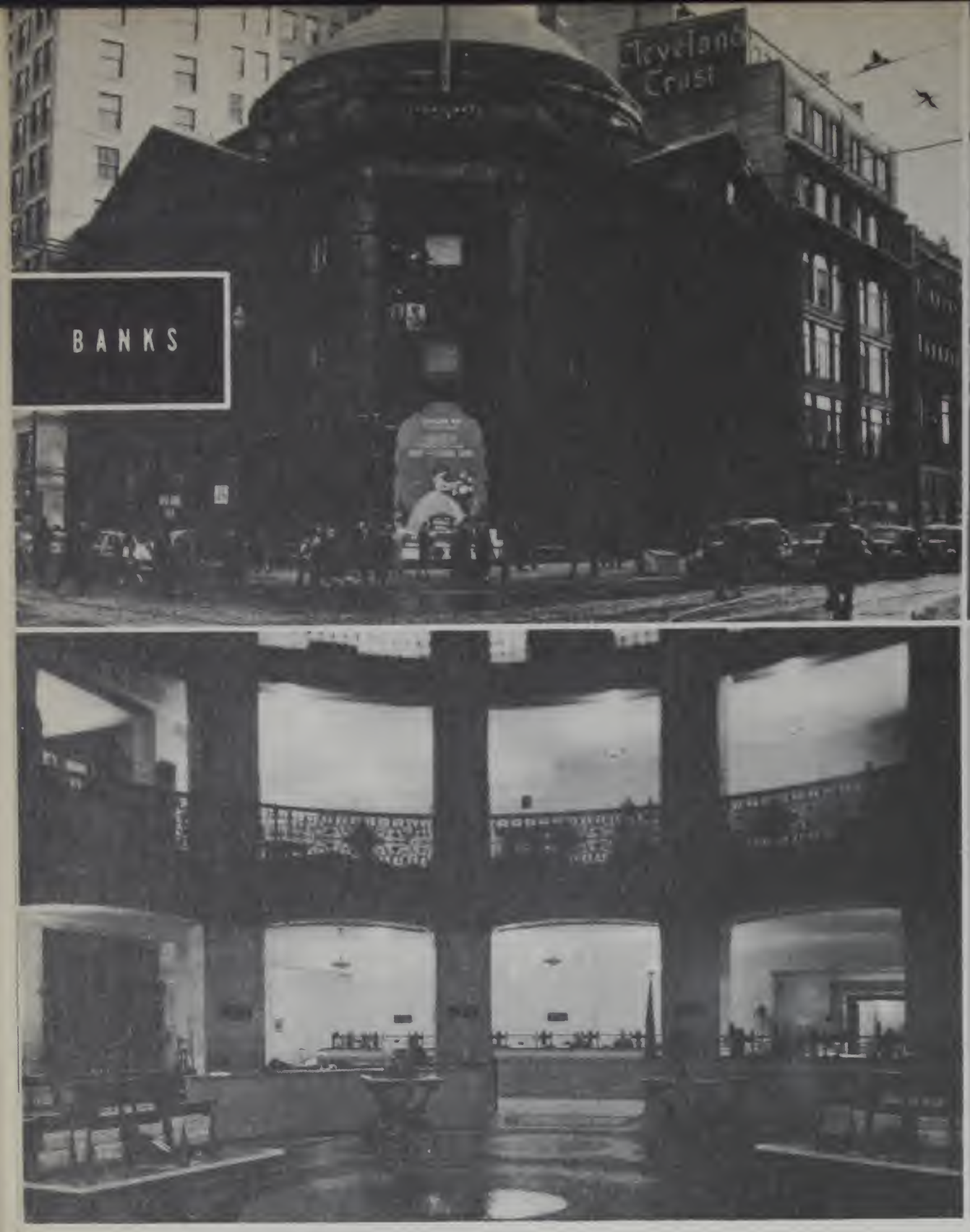
Exterior of six-story apartment hotel, the Park Lane Villa.



PROBLEM: In the Park Lane Villa of Cleveland, Ohio, an imposing six-story apartment hotel, trouble was experienced on the top floor with almost unbearable heat and extremely close atmospheric conditions during the Summertime. Suites on the sixth floor were practically unrentable during the Summer months.

SOLUTION: Twelve ILG Power Roof Ventilators, ten 16" and two 30", (each unit comprised of an ILG Self-Cooled Motor Propeller Fan in a Penthouse with Automatic Shutters) were installed to draw off the excessive heat from the top floor apartments. A continuous cooling breeze is drawn in through open windows, circulated through the rooms, and carried up through ceiling grilles to the exhaust units on the roof. The system provides daytime comfort as well as sleep-inviting night-cooling at moderate first cost, low operating cost, and at negligible maintenance cost.

RESULTS: The manager reports not only elimination of the heat problem on the sixth floor, but unexpected benefits to the lower floors from the removal of the former blanket of heat. The rental situation has definitely improved.



(Left, above) Exterior of Cleveland Trust Company, a respected landmark in Cleveland, Ohio.

(Left) View of the attractive main foyer and balconies leading to various offices.

(Above) ILG Blower forces air through filters and heating coils to supply main foyer and offices with fresh, filtered, and tempered air.

PROBLEM: In a large building occupied by the Cleveland Trust Co. in Cleveland, Ohio, it was necessary to provide both supply and exhaust of air, with the air being supplied to be heated in the Wintertime and filtered.

SOLUTION: One ILG No. 60 Direct-Connected Blower supplies air to the main foyer and offices through a battery of filters and steam coils for tempering incoming air in the Winter. Another No. 60 ILG Blower and two 30″ ILG Self-Cooled Motor Propeller Fans exhaust the air from the foyer and offices. A No. 35 ILG Blower supplies air for the basement offices of the Maintenance Department, also locker rooms and wash rooms. Several additional ILG Propeller Fans provide exhaust for different parts of the building.

RESULTS: Improved air conditions are provided for patrons and employees throughout the entire building, exhausting bad air, heat, and odors, while supplying fresh, filtered air.

(Left) Exterior of barn showing location of Automatic Shutter, which prevents back drafts and protects fan from motor overload due to wind pressure.

(Right) In this interior view, note how duct has inlet near floor line for Winter operation, with door in duct near ceiling for air inlet during Summer.

PROBLEM: Breeders of registered Jerseys, owners of the Coldwater Jersey Farm at Coldwater, Michigan, were troubled with a faulty ventilating system which made their old barn extremely damp during periods of severely cold weather. It was impossible to control the stable temperature, keep the stable dry, or supply the cattle with necessary fresh air. Several calves were lost due to the unhealthful conditions.

SOLUTION: When a new barn was erected, considerable thought was given to the ventilating system, resulting in the installation of three 16″ ILG Self-Cooled Motor Propeller Fans with Automatic Shutters in the two barns. Thermostatic control maintains desirable stable temperature while a speed controller regulates air volume. Electrically operated, the system functions positively and automatically without dependence upon outside temperature, wind direction, or velocity.

RESULTS: Atmospheric conditions are greatly improved; the herd of Jerseys is in excellent health; stable walls and ceilings are dry at all times; an abundance of pure, fresh air is supplied while barn odors are rapidly removed.

CHURCHES

Exterior of St. Mary's Church, with arrow pointing to one ILG Automatic Shutter.

(Above, left) Note how ceiling grilles blend into the beautiful architectural design.

(Left) Attic space, indicating location of ILG Fans in outer wall.

PROBLEM: St. Mary's Church of Washington, D. C., faced a common church ventilating problem — to remove dead, stagnant air before services, to eliminate heat in the Summertime, and to relieve stuffiness in the Winter . . . without disturbing operating noise . . . and without excessive cost, considering the relatively limited use of the equipment.

SOLUTION: Three 42" S ILG Self-Cooled Motor Propeller Fans with Automatic Shutters were installed in the attic space, drawing stale air and excessive heat up through six architecturally blended ceiling grilles. With a combined capacity of over 36,000 cubic feet of air per minute, better than a three-minute air change is provided in the church auditorium. Started a few moments before the first services begin in the morning, the ILG Fans quickly sweep out the accumulated dead air and draw in fresh outdoor air through normal building openings.

RESULTS: Church-goers enter an auditorium filled with fresh, sweet air — conditions which are maintained throughout the services. Rapid air change during the Summer produces a comfortable sitting atmosphere. Stuffy, close air conditions during the Winter are eliminated. Supremely quiet operation prevents irritating noise. Original, operating, and maintenance costs are at a minimum.

(Left) Church exterior, with arrow pointing to ILG Automatic Shutter.

(Right) Installation of ILG Fan at back of auditorium necessitates exceptionally quiet operation.

PROBLEM: The Immanuel Baptist Church of Ravenswood, Chicago, is of average size and was subject to the troubles of excessive heat in Summer and lack of fresh air in the Winter. Intermittent use of the church auditorium plus limited finances dictated the purchase of economical equipment.

SOLUTION: A 30" ILG Self-Cooled Motor Propeller Fan with Automatic Shutter was installed in a front window of the church, at one end of the auditorium (a testimonial in itself to the extreme quietness of the operation of ILG Fans). Cool air is drawn up from the basement and from the outside through normal building openings, circulated through the auditorium and exhausted by the fan for Summertime comfort. With a capacity congregation in the Wintertime, constant air change provides relief from otherwise stuffy conditions.

RESULTS: The pastor of this church points out that the congregation has benefited from the removal of oppressive heat during Summer months as well as the supply of fresh air during the Winter. When windows and doors are closed, constant air change prevents the spreading of colds. First cost was moderate, operating costs are low.

Exterior of club house, showing location of ILG Fans used to ventilate the large hall.

Close-up of one ILG Fan installed in attic, drawing up through ceiling grilles.

COUNTRY CLUBS

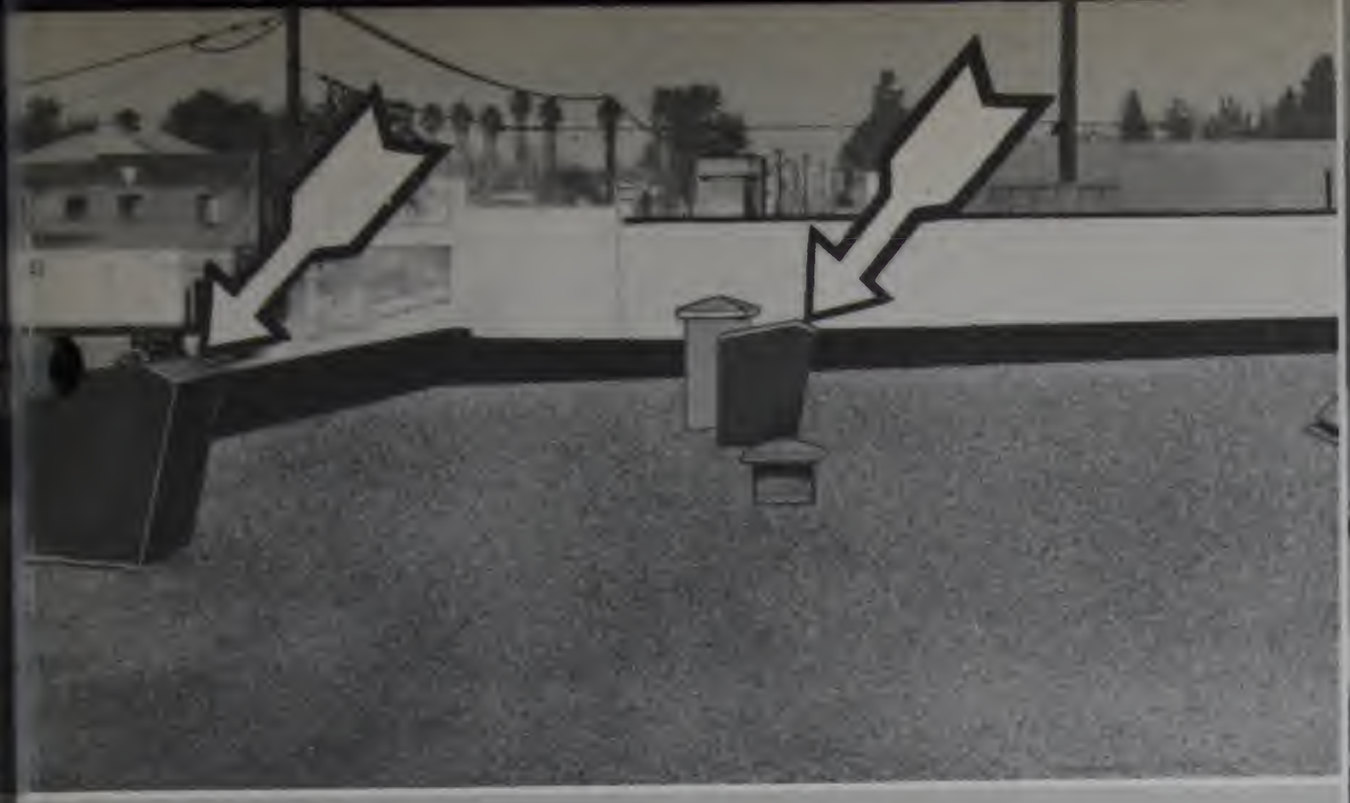
PROBLEM: The Edgewater Golf Club of Chicago had problems confronting all country clubs—adequate ventilation of a great many individual rooms—auditorium, grille, locker, shower rooms, toilets, etc. Smoke, heat, moisture, and odors were present in the Summertime . . . smoke and stale air gave trouble during Fall and Winter.

SOLUTION: Two 30″ ILG Self-Cooled Motor Propeller Fans were installed in the attic space above the large hall to draw cool outside air in, circulate it through the hall, and on up through ceiling grilles to the attic where it is finally exhausted. The grille, locker room, shower room, and toilet rooms are each ventilated with an 18″ ILG Fan to remove foul air, odors, steam, tobacco smoke, and oppressive heat.

(Upper) View in locker room, where steam and odors are removed at their source.

(Lower) "Spot" ventilation of toilet, through ILG Fan installed at rear of lavatory.

RESULTS: Club members enjoy a club house that is cool and restful, with improved conditions throughout. Particularly gratifying to members is the economy of operation which is an added dividend to the low first cost of this equipment.



Steam is exhausted through ILG Power Roof Ventilators.

Exterior view of up-to-date, modern California creamery.

CREAMERIES

Excess moisture and steam are swiftly removed from can sterilizing department.

PROBLEM: Steam from washing and sterilizing operations decreased visibility within the Fosselman Creamery at Pasadena, California, slowing down processes and increasing danger of accidents. In addition, condensation on the ceiling caused rotting of the timbers and the maintenance of a constantly muggy atmospheric condition.

SOLUTION: Two 24" SH ILG Power Roof Ventilators (consisting of ILG Self-Cooled Motor Propeller Fans in Penthouses, equipped with Automatic Shutters) were installed, one over the processing room, the other over the milk can washers. Rising steam is quickly captured, drawn up, and exhausted out of the roof ventilators. At the same time, cool fresh air is drawn into the building, circulated through the plant, and exhausted with the steam.

RESULTS: Visibility is perceptibly improved, condensation has been practically eliminated, and employees work more efficiently in a cooler, more comfortable atmosphere. Installation and operation costs are at a minimum.

DAIRY STORES

(Above) ILG B25 Blower swiftly removes cooking fumes and heat from kitchen.

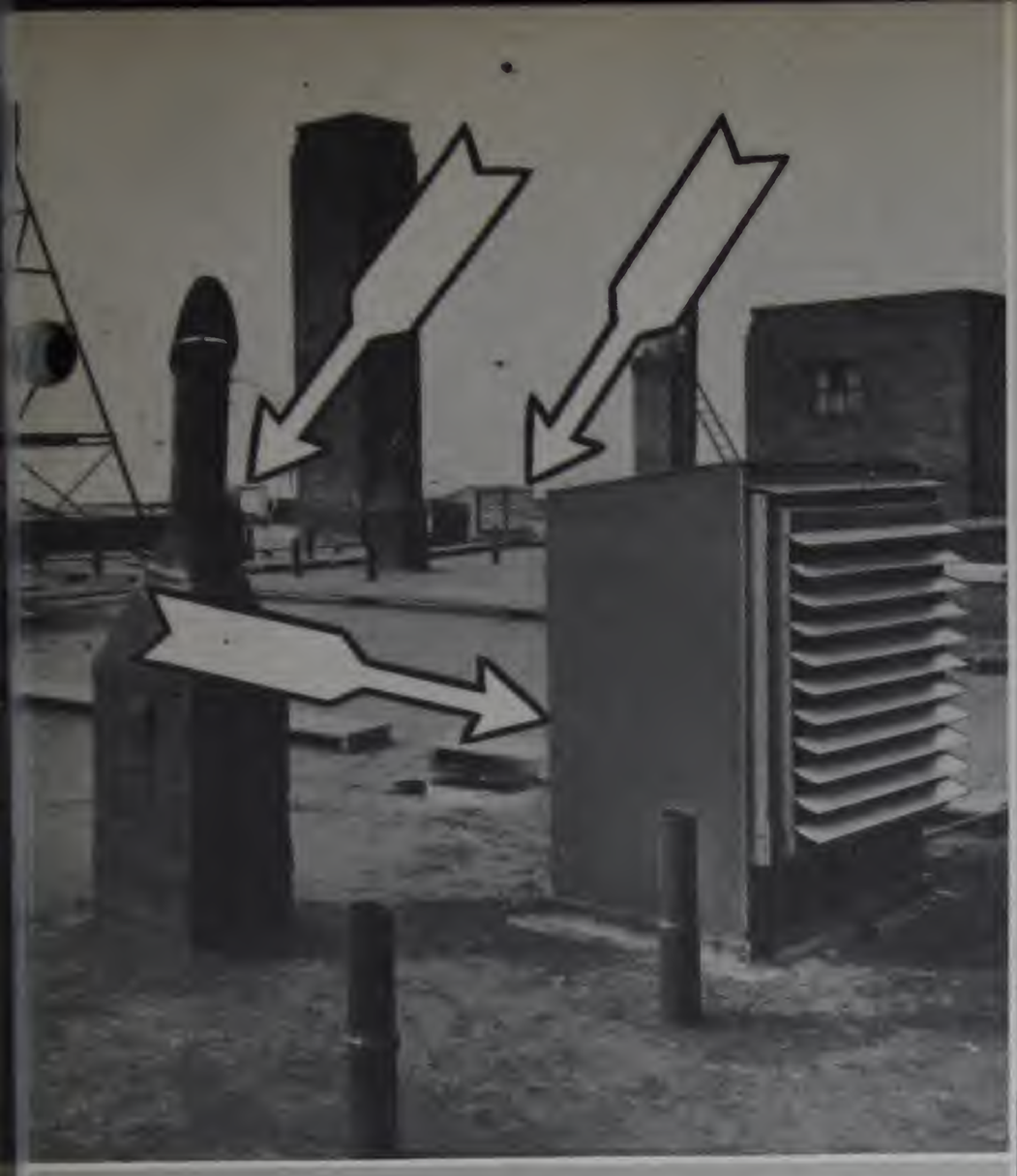
Columbus plant of Isaly Dairy Co., one of six distributing plants.

ILG B18 Blower in basement removes steam and odors from various toilets.

PROBLEM: The Isaly Dairy Co. of Columbus, Ohio, operates six distributing plants in Ohio and Pennsylvania. Pictured here is the headquarters building of the organization. Exhaust was required of the heat and odors from cooking operations, also steam and odors from the various toilets.

SOLUTION: Through a duct attached to a canopy over the kitchen range, an ILG B25 Direct-Connected Blower quickly removes "greasy grime" and cooking odors. An ILG B18 Direct-Connected Blower is located in the basement with ducts leading to the various toilets. Odors and steam are quickly exhausted out-of-doors.

RESULTS: Not only have the ILG Blowers been effectively handling their assignments, but R. C. Isaly, General Manager, reports that they have been operating eighteen to twenty-four hours a day over a period of years with a minimum amount of attention.

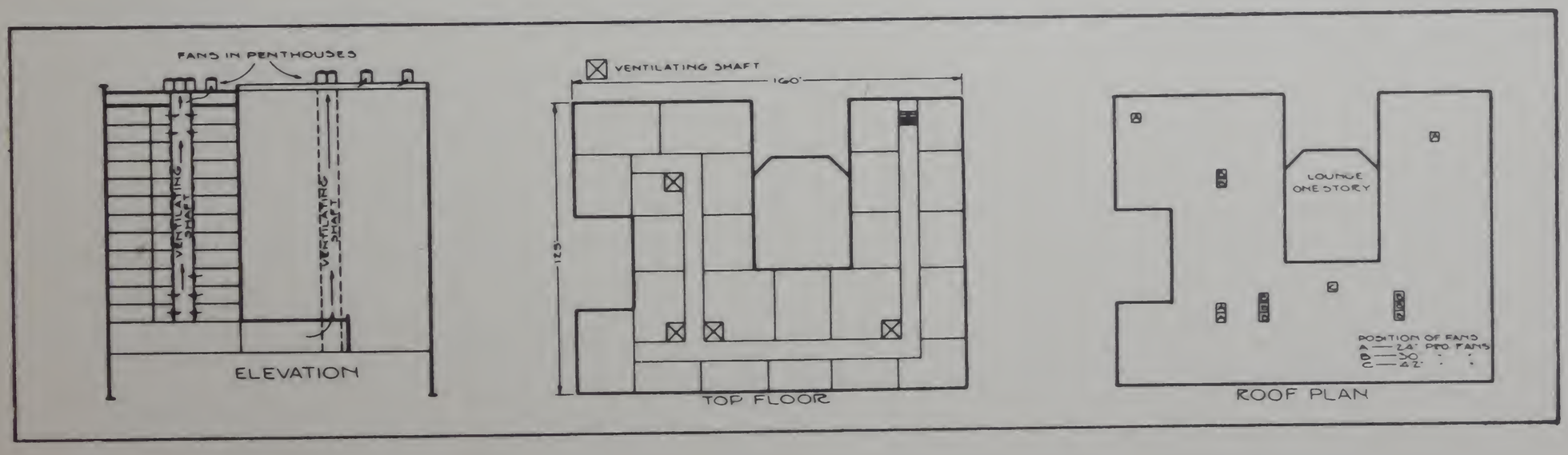


(Above) ILG Power Roof Ventilators provide 1-minute air change throughout hotel hallways.

(Right) Hotel Commodore, which has an ILG air-cooled top floor.

PROBLEM: Management of the 12-story Commodore Hotel in Cleveland, Ohio, was faced with the common problem of an excessively warm top floor during Summer months, plus inadequate ventilation of the entire building.

SOLUTION: Six 24″ and six 30″ ILG Self-Cooled Motor Propeller Fans with Automatic Shutters were installed in penthouses already on the roof. Two 42″ ILG Power Roof Ventilators (Self-Cooled Motor Propeller Fans with Automatic Shutters in Penthouses) were installed in addition as indicated on the accompanying roof plan. As each tenant opens his transom, fresh air is drawn into his room, stale air and heat are exhausted into the hall and up the ventilating shaft. Supplementary circulation was given top floor tenants by installing grilles in the hallways and by making openings in the attic space on the North side of the building.



RESULTS: A one-minute air change is provided in each hallway throughout the building. Top floor tenants enjoy cool, comfortable surroundings even during heat waves. Installation costs were low, operating costs are negligible.

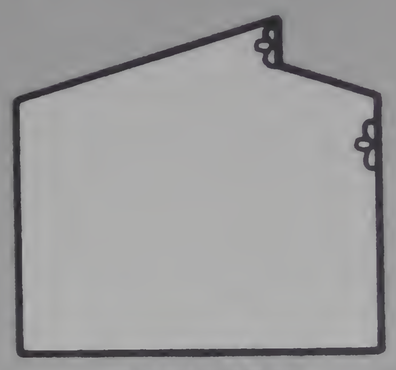
(Upper Left) ILG BC35 Blower in basement . . . *(Center Left)* ILG 24" Fan in opening under kitchen range hood . . . *(Lower Left)* ILG Unit Heater in cabin . . . *(Above—Upper)* View of main building showing one 10" ILG Fan in men's toilet room, also 16" ILG Fan with Automatic Shutters mounted in penthouse on boarded-up Bar-B-Q room. . . . *(Above—Lower)* Interior of restaurant. Note two of eight grilles through which heat and cool air are supplied.

PROBLEM: Several different problems were encountered in this single installation at the Cabin Grill Tourist Court near Toledo, Ohio. It was necessary to heat and cool both the main building (office, restaurant, toilets) and the cabins to make them comfortable all year 'round. In addition, cooking fumes, heat, and odors were to be exhausted from the kitchen and Bar-B-Q room, odors and steam from the toilets in the main building.

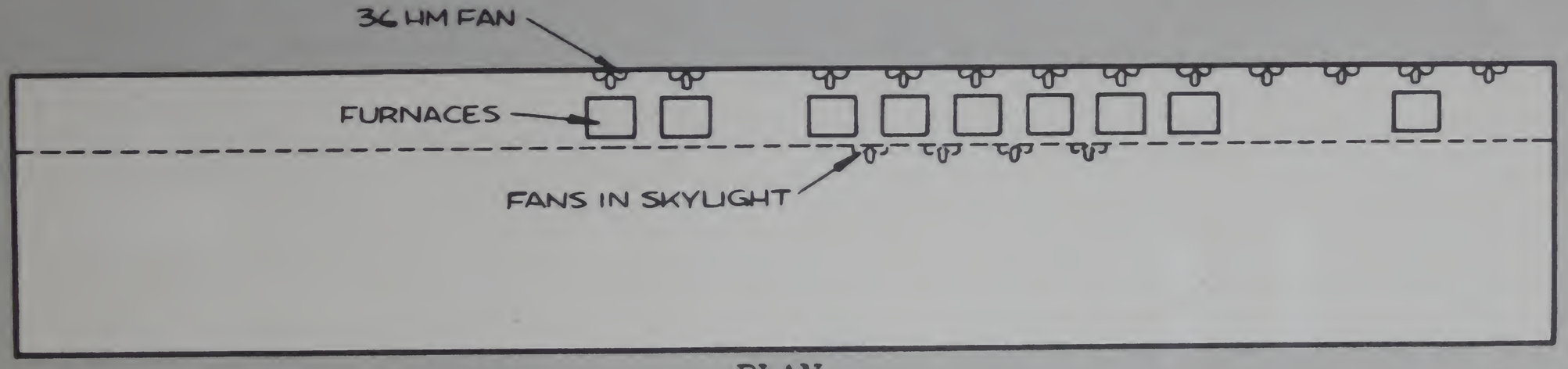
SOLUTION: One B35 ILG Direct-Connected Blower with Variable Air Controller forces warm air in the Winter, cool air in the Summer through ducts and grilles into the restaurant. One 24", one 16", and two 10" ILG Self-Cooled Motor Propeller Fans exhaust fumes, smoke, heat, odors, etc. from the kitchen, the Bar-B-Q room and the men's and women's toilet rooms. Ten ILG Unit Heaters under thermostatic control provide Winter heat and Summer cooling for the individual cabins.

RESULTS: Although wartime shortages of food and traffic made necessary the closing of the restaurant (and the wrapping up of the Aerofin continuous water tube coil in the basement), the remainder of the installation is rendering complete satisfaction.

Unusual photograph, with shafts of light coming through propeller fan openings in side wall and skylight of Cincinnati foundry.



SECTION



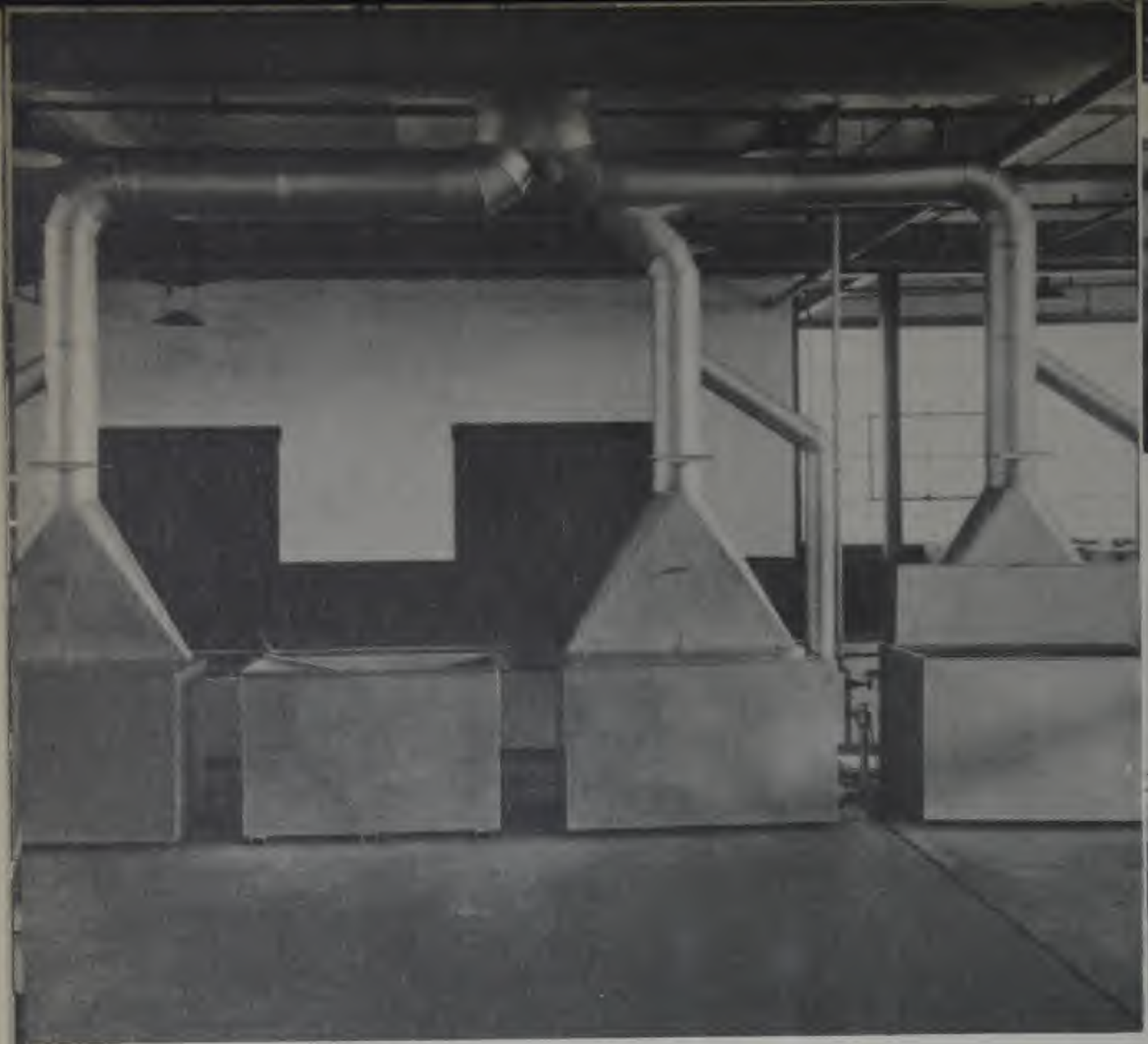
PLAN

FOUNDRY

PROBLEM: The Tool Gear and Pinion Co., Elmwood Place, Cincinnati, were confronted with a smoke problem in a large foundry approximately 320 feet long, 60 feet wide, and 50 feet high. Several high-cost suggestions were made by various manufacturers and one or two unsatisfactory experiments were made.

SOLUTION: Sixteen 36" HM ILG Self-Cooled Motor Propeller Fans were installed in the side wall and in the skylight as indicated in the accompanying drawings. Smoke, heat, and monoxide gas given off by the furnaces during the several hours required to bring them up to temperature are quickly removed and replaced with fresh air from out-of-doors. Increased visibility now makes it possible for crane operators aloft, as well as moulders on the floor to work faster with less danger of accidents.

RESULTS: Plant management is pleased with the effectiveness of the system, plus its simplicity and relatively low cost. It has been proved in action as conclusively superior to other types of systems which were recommended and tested.



Plating tanks showing slotted hoods and ducts for removal of toxic vapors.

Another plating vat installation, removing fumes from four different tanks.

ILG Blower on roof exhausts fumes from plating tanks shown in picture immediately above.

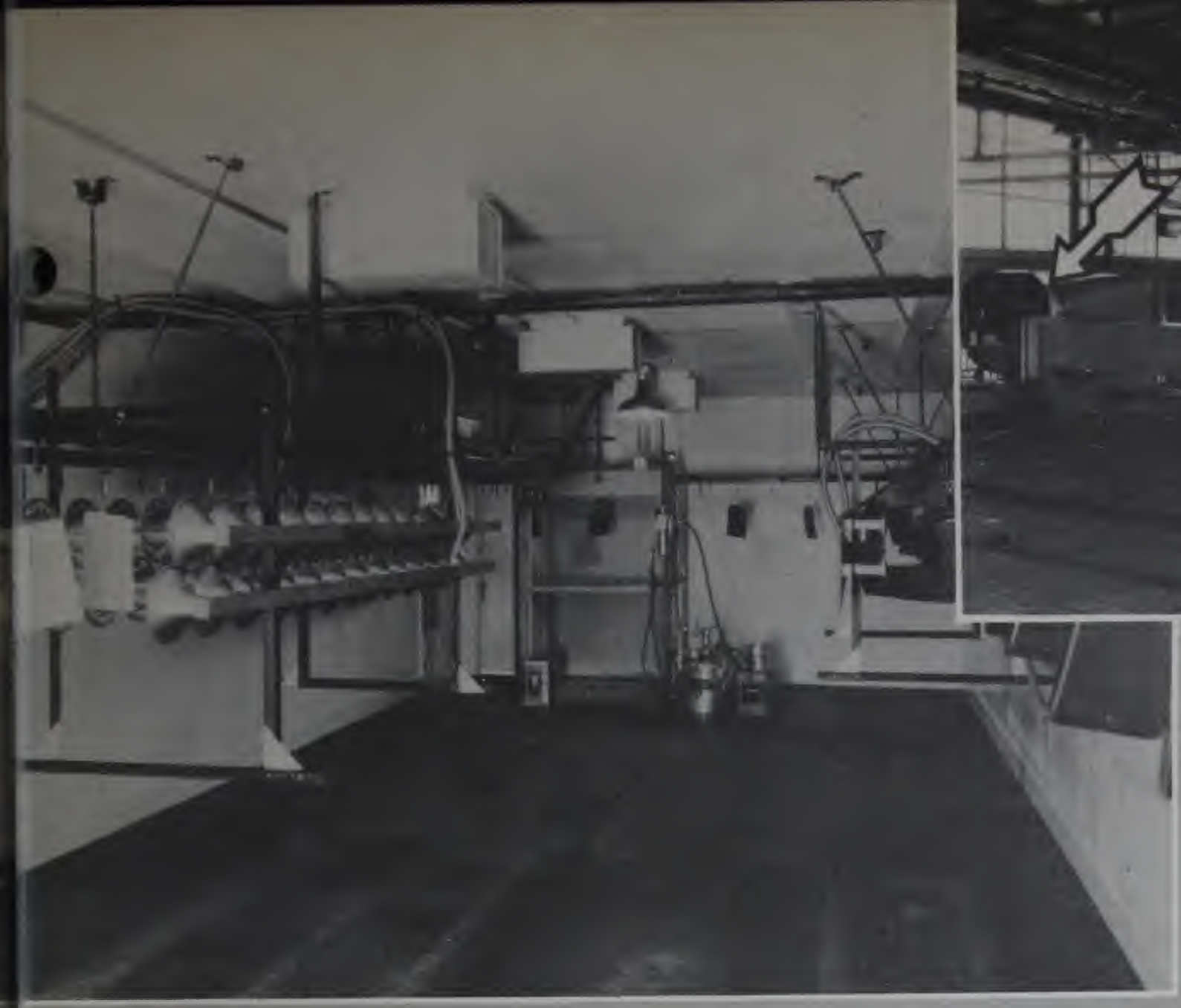
ILG Blower and Power Roof Ventilators exhausting vapors from plating tanks.

PLATING FUMES

PROBLEM: In the plant of Gale Products at Galesburg, Illinois, removal of toxic vapors was necessary to prevent ill effects on operators working around Anodic Treatment, Alrock, and Hot Water Tanks. (For handling of paint spray, see next page.)

SOLUTION: One BC40 and one BC60 ILG Direct-Connected Blowers, plus three 20″ SH ILG Power Roof Ventilators (ILG Self-Cooled Motor Propeller Fans with Automatic Shutters in Penthouses) are mounted on the roof. Connected through ducts to scientifically designed slotted hoods and canopies over tanks, the ILG equipment rapidly removes toxic vapors.

RESULTS: Operators work without fear of danger from toxic vapors; accident hazards are reduced; equipment depreciation caused by condensation of vapors is practically eliminated.



One of two batteries of Infra-Red drying lamps outside of paint spray booths.

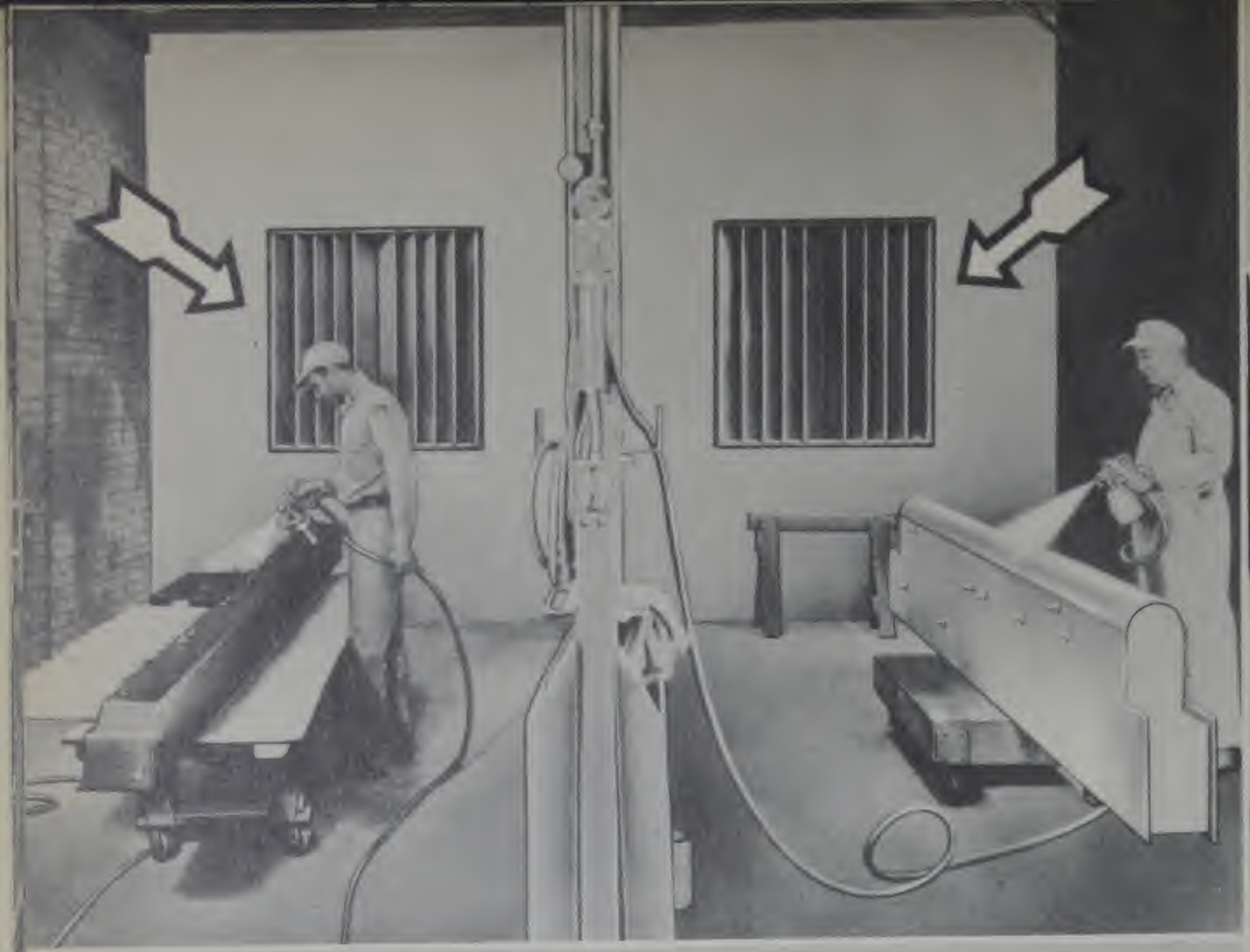
ILG Blower and ducts leading up from paint room.

PROBLEM: Another interesting installation at the Gale Products Plant at Galesburg, Illinois, handles both supply and exhaust from paint spray booths and Infra-Red drying room.

SOLUTION: One ILG Direct-Connected Blower introduces fresh air into the paint room through filters on the exhaust side of the blower. ILG Power Roof Ventilators (ILG Self-Cooled Motor Propeller Fans with Automatic Shutters in Penthouses) exhaust air from the two spray booths, also the heat from the Infra-Red drying lamps. The paint room is placed under pressure by supplying more air than is exhausted, thus preventing infiltration of unfiltered air.

PAINT SPRAY

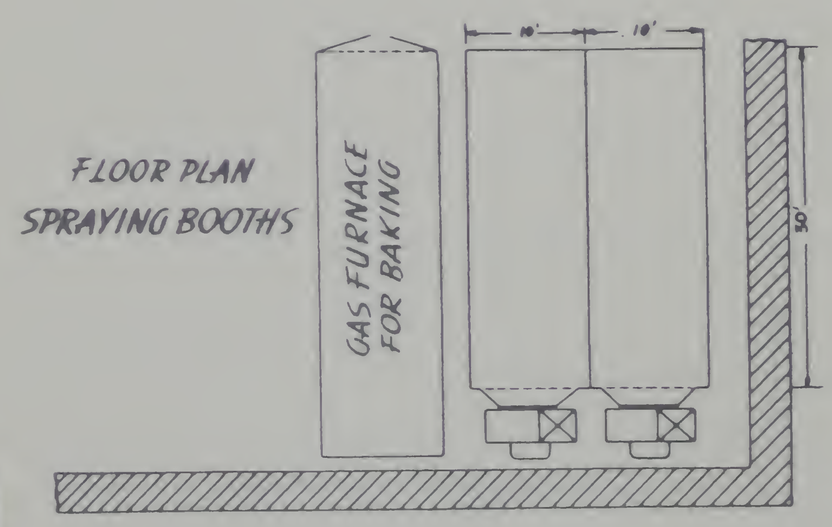
RESULTS: Materials travel through spray booths and drying room on continuous conveyor, speeding production while employees work in healthful air conditions.



(Above) Outlets from spray booths indicated by arrows lead into inlets of ILG Blowers.

(Below) Full capacity in restricted area is possible with ILG Direct-Connected Blowers.

PAINT SPRAY



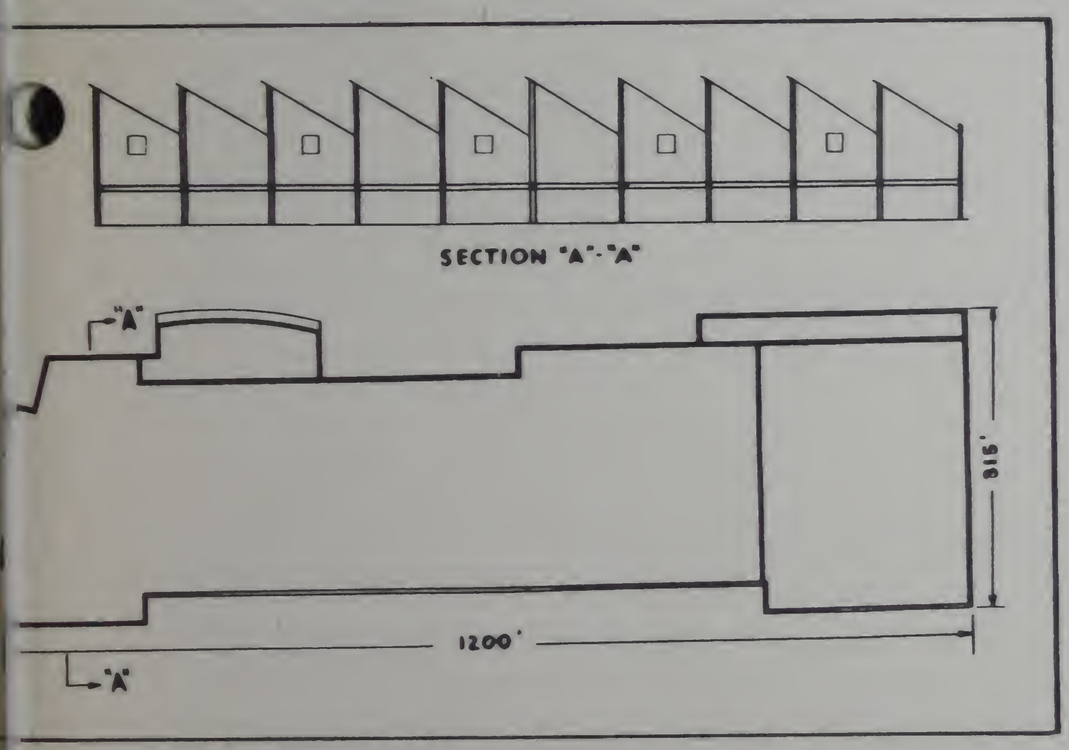
PROBLEM: Modernizing of the Paint Department in the Los Angeles plant of the Electrical Products Corporation, called for installation of two new spray booths and a baking oven. Adequate ventilating equipment was a necessity to remove paint fumes, heat, odors, stale air, etc., allowing employees to work at peak efficiency in a comfortable atmosphere. One complication of the problem involved the small amount of space available for placement of blowers and duct work.

SOLUTION: Two ILG BC60 Universal Blowers were selected for the job, primarily because of their direct-connected feature. With motor recessed into blower housing and with wheel mounted directly onto short drive shaft, these extremely compact units permitted installation of adequate capacity in the limited space available. Also, since the blowers are not too readily accessible, it would have been difficult to frequently service or replace belts. Ducts from the blowers lead directly upward to outlets in the roof.

RESULTS: Obnoxious paint fumes, together with heat from the baking oven, are swiftly removed, making it unnecessary for the sprayers to wear masks. The installation has proved highly satisfactory.

At Right: Interior view of Nabisco Cracker Bakery showing straight line production system. Note how ILG Self-Cooled Motor Propeller Fans are installed in peak of monitor.

Exterior of spacious, well-lighted, airy bakery—claimed to be the first of its kind in the world.



Side elevation and floor plan of Nabisco Plant where some ILG Fans operate twenty-four hours a day.

PROBLEM: In designing a radically new type of cracker bakery for the National Biscuit Co. at Atlanta, Georgia, several heating and ventilating problems were encountered. With practically no windows on the outside walls, the plant is lighted by day through overhead sawtooth skylights. Straight line production involved using a series of specially designed traveling band ovens, each of which measures over 800 feet. In addition to removing excessive heat from the manufacturing process, heat, vapors, and odors were to be exhausted from the rest rooms, smoking rooms, lockers, washrooms, dressing rooms, showers, cafeteria, and first aid department, while providing suitable air conditions throughout the building.

HEAT AND HUMIDITY

SOLUTION: With windows and skylights sealed tight, a system of forced draft and mechanical exhaust provides necessary heat distribution and ventilation. As a major factor in this system, fifty-seven 36″ ILG Self-Cooled Motor Propeller Fans exhaust excessive heat and supply fresh air.

RESULTS: Flexibility of operation, greater degree of control under all climatic conditions; reduction in sizes of main fans and ducts required; saving in installation costs; decrease in amount of critical materials required.

(Left) Interior of Coca Cola Company bottling room, showing five ILG Propeller Fans installed in windows facing the street.

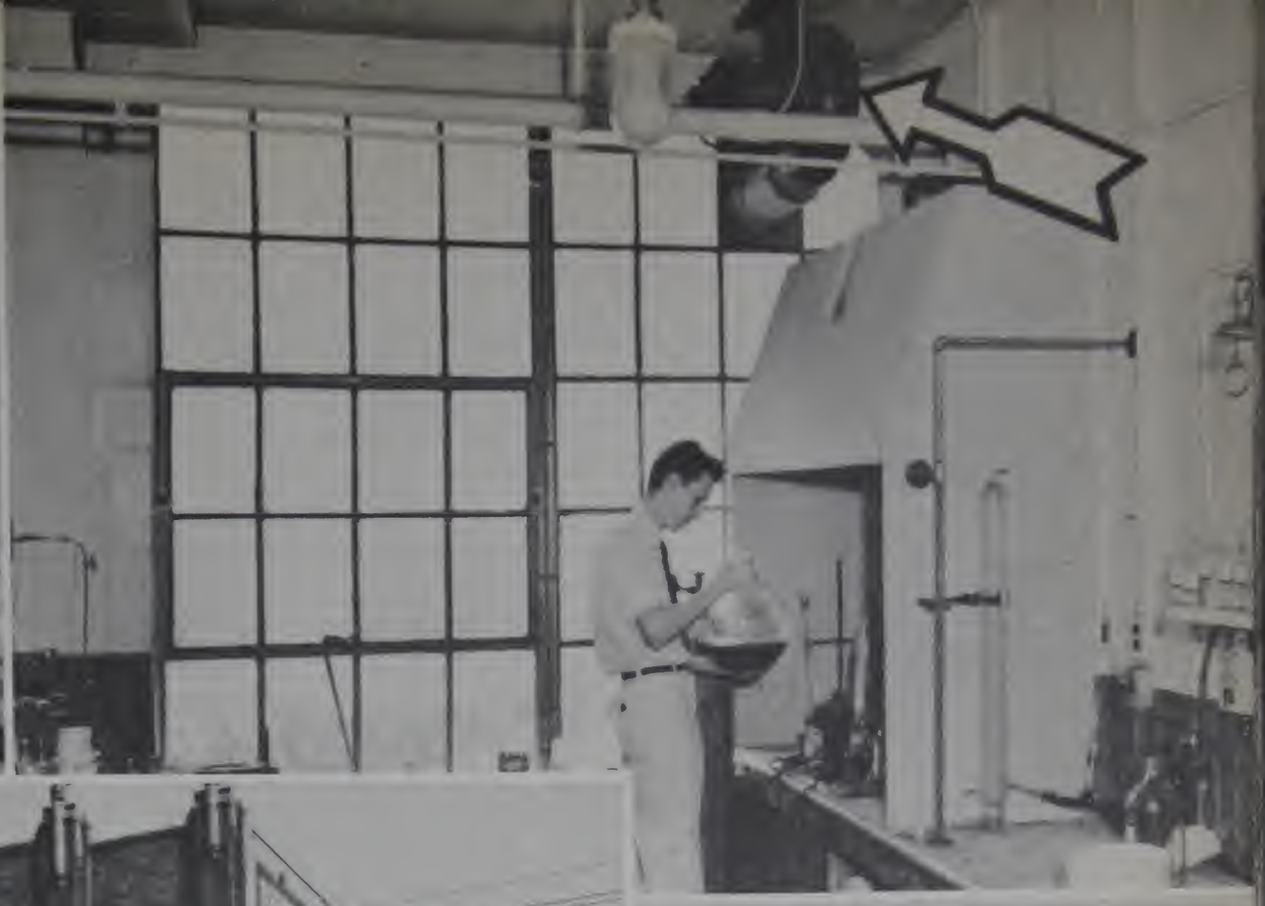
(Right) Exterior of bottling works, with arrows pointing to ILG Automatic Shutters installed in windows, at outlets of Propeller Fans.

PROBLEM: In a plant 241 feet long by 85 feet wide, the Coca Cola Bottling Co. of Kansas City, Mo., was faced with a heat and humidity problem, primarily centering around the bottling machines.

HEAT AND HUMIDITY

SOLUTION: A battery of five 30″ HS ILG Self-Cooled Motor Propeller Fans were installed in windows on the front wall adjacent to the bottling machinery. Each fan was equipped with a galvanized Automatic Shutter. Moisture released at the bottling machine is immediately exhausted. In addition, the fans draw in fresh air at the opposite end of the building, circulate it through the room for a cooling effect, and exhaust it along with the accumulated heat.

RESULTS: A perceptible reduction has been made in both heat and humidity. Note simplicity of installation of fans and shutters in the window panes.



(Above) Ceiling mounted ILG B25W Blower exhausting chemical fumes. *(Right)* Exterior of pharmaceutical plant.

ILG P20 Lithcoted Blower, mounted on ceiling, exhausts fumes from Testing Laboratory.

PROBLEM: Geo. A. Breon & Company, Inc., manufacturing pharmaceutical chemists of Kansas City, Missouri, experienced difficulty of removing severely corrosive fumes from the chemical and testing laboratories.

SOLUTION: Based upon experience with other ILG equipment used in the plant for strictly ventilating purposes, a P20 ILG Blower in a double fume hood with Lithcote finish was installed in the testing laboratory. Another B25W Blower was mounted on the ceiling of the chemistry laboratory, drawing from a fume hood.

LABORATORY

RESULTS: It is reported that, after a fair trial, the ILG Blowers are holding up satisfactorily while handling the corrosive fumes generated in the fume hoods. The management expects to get many years of satisfactory service from the units.

(Left) ILG Unit Heater installation inside dye house. Exterior of building shown at lower left.

(Above) Arrows point to intakes to ILG Unit Heaters. Note ILG Fan installations along monitor in background.

PROBLEM: The E. & W. Dyeing Corp., Paterson, N. J., had a heat and humidity problem common to most dye houses and textile finishing plants. On the coldest days of winter, fog would collect in the dye house, and excessively high relative humidity caused annoyance throughout the entire structure. Heating was accomplished by means of a system of pipe coils mounted along the walls — an unsatisfactory method at best, and decidedly inefficient in a plant of this type.

SOLUTION: In June of 1937, the company moved to a new plant in which they had installed 26 ILG Unit Heaters and 12 ILG Self-Cooled Motor Propeller Fans. In the dye house and finishing room, air inlets of the unit heaters were connected to the outside and provided with recirculating dampers which effected considerable economy in operation during the Winter months. In the Summertime, the rate of air change is sufficient to provide ideal working conditions, regardless of the large amount of moisture and heat thrown off by plant equipment.

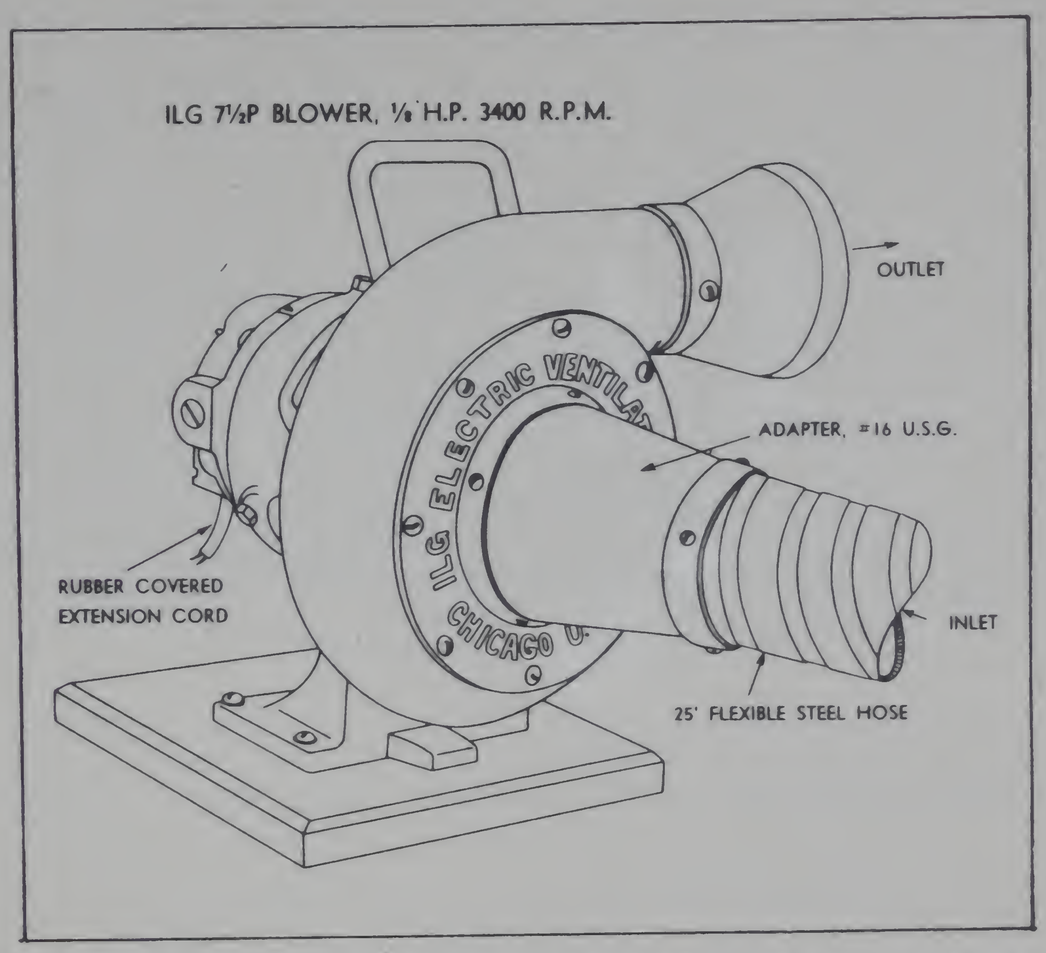
FOG PREVENTION

RESULTS: During the Wintertime, the dye house is reported entirely free from fog while the entire plant is comfortably heated and supplied with fresh air. Rapid air change in the Summer removes moisture and heat, speeding production.

(Above) Welder at work welding struts to floor plates of ship. Note flexible steel tube which is connected to ILG Portable Welding Fume Exhauster.

ILG 7½P Portable Welding Exhauster with overload switch, carrying handle and outlet adapter, mounted on metal base.

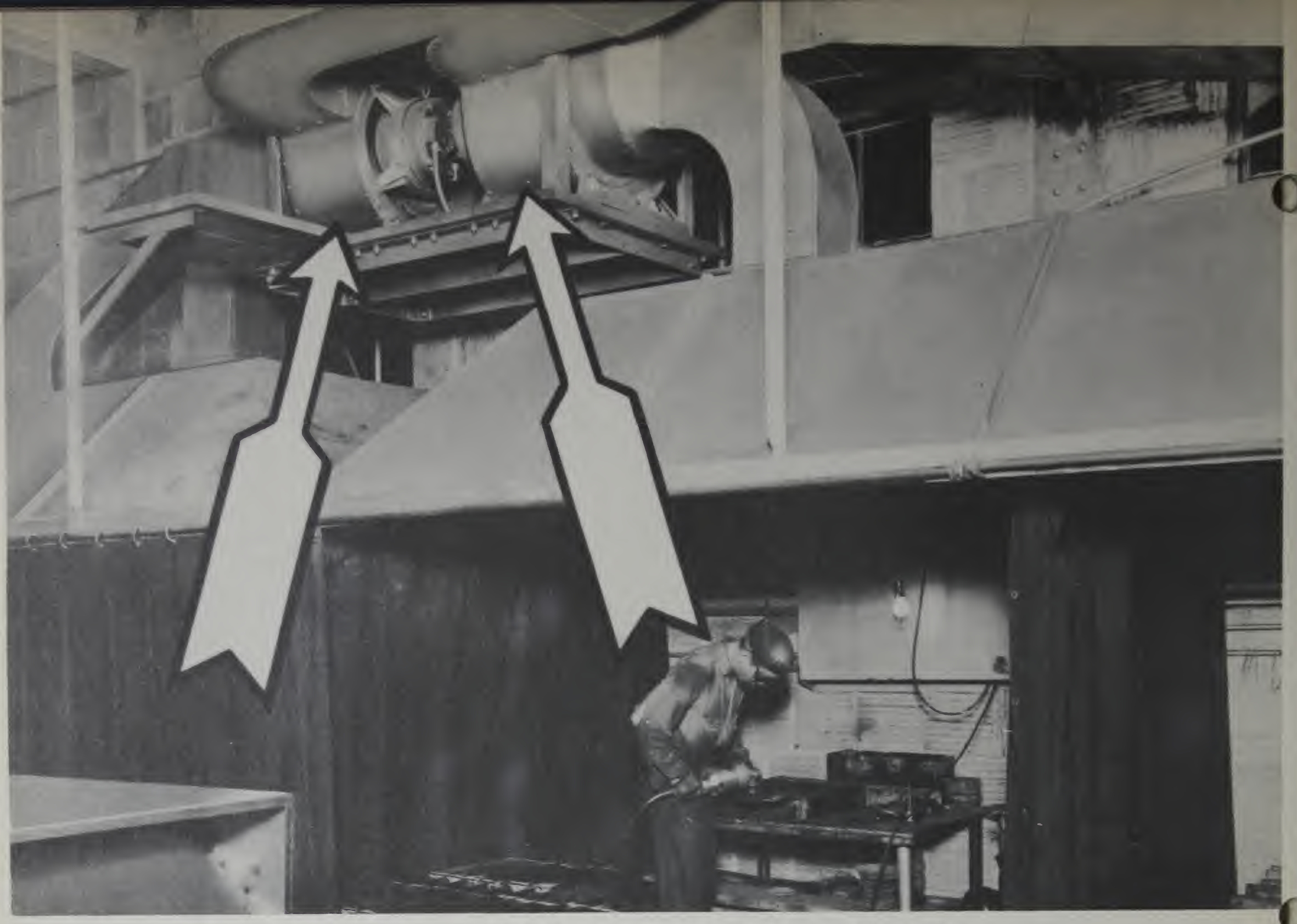
PROBLEM: Greatly stimulated use of welding, plus uses on new metals . . . handled by inexperienced operators under tension . . . have accentuated problems of industrial health hazards. Eye injuries and skin burns from the arc light or molten metal can be prevented by use of safety clothing, helmets, and screens. But the insidious foe of health, often causing illnesses such as metal fume fever, metal poisoning, etc., (as well as explosion hazards) . . . in adequate ventilation . . . is often overlooked.



(Above) Diagram shows how ILG 7½P Blower has been adapted for portable welding exhaust. Carrying handle, motor shield, overload switch, adapters, flexible hose, and extension cord are accessories which may be included if desired.

SOLUTION: Quick removal of gases, fumes, smoke, and excessive heat by local exhaust, either portable or permanently installed units, has proved to be an effective means of reducing health hazards. Illustration above pictures ILG Portable Welding Fume Exhauster, used in welding inside tractors, tanks, or planes, also in holds of ships. Permanent installations can be effectively designed using standard ILG Self-Cooled Motor Propeller Fans or Direct-Connected Blowers.

RESULTS: Sparks, gases, fumes, and heat are swiftly removed from point of operation, permitting welders to work in comfort, free from the dangers of illness frequently caused by inadequate ventilation of the welding booth.



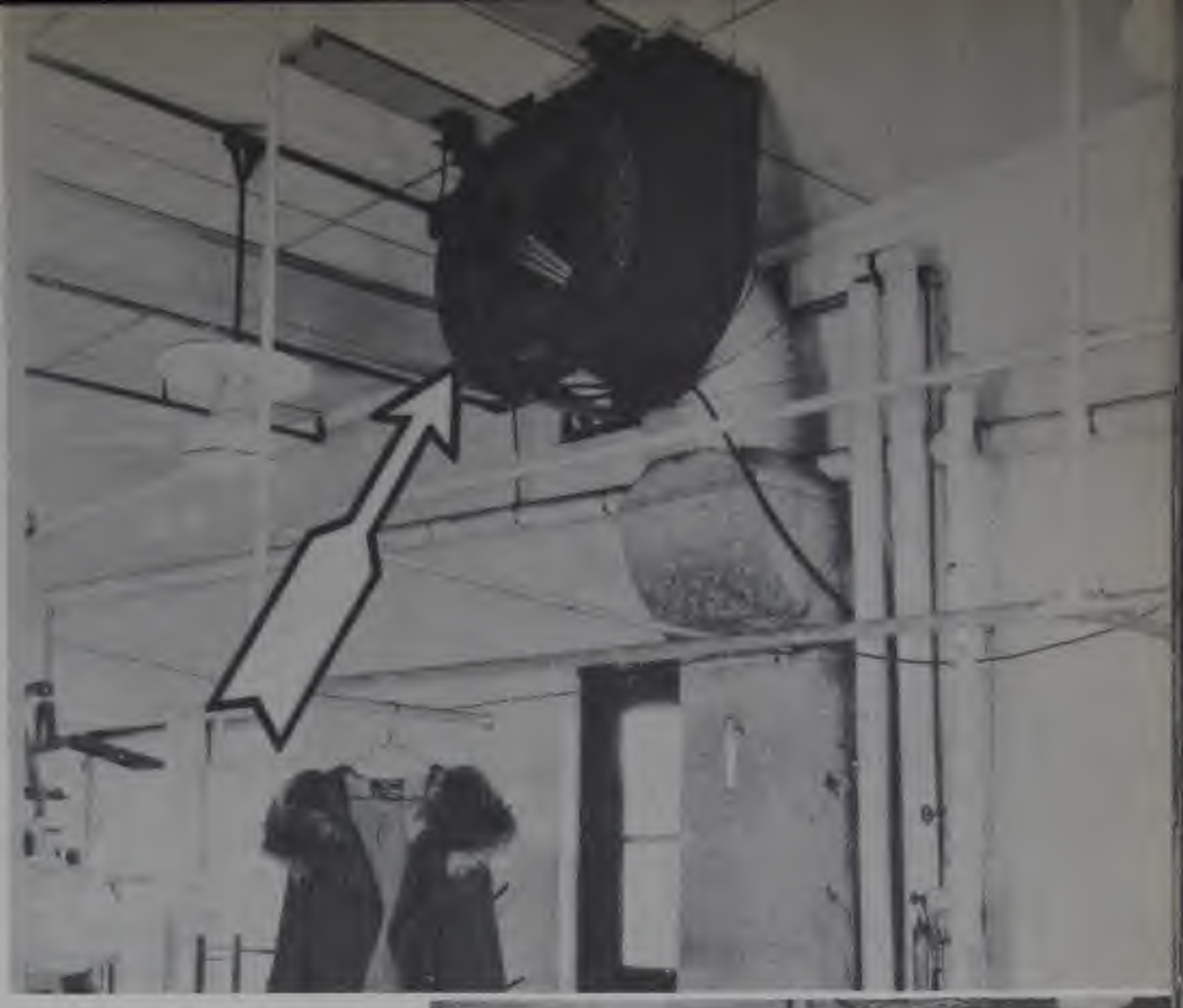
Compactly installed ILG Direct-Connected Blowers above grinding booths.

PROBLEM: In the Chicago plant of the Link Belt Company a row of grinding booths required removal of fine particles and dust to prevent silicosis and other allied ailments of employees.

SOLUTION: A large canopy was installed over the line of grinding booths. Ducts connected to the canopy above each booth lead to two ILG Direct-Connected Blowers mounted on a platform up above one end of the canopy. Air containing dust given off from grinding operations is pulled up and out of booths. Employees work in safe, purified air, free from fine dust particles which might cause dread diseases. Note: Only blowers in which motors are direct-connected to blower wheels could be so compactly installed.

RESULTS: Happier employer-employee relations, elimination of health hazards, reduced maintenance costs of plant buildings and equipment, fewer work stoppages from abrasive dust on bearings or other metal moving parts, and fewer rejects of finished parts.

30″ ILG Fan in skylight swiftly removes heat created in shirt ironing department.



ILG B35 Blower, mounted on ceiling of room above ironing machine, shown below.

Canopy over ironing machine gathers heat and steam for removal by ILG B35 Blower illustrated above.

PROBLEM: Excessive heat, steam, fumes, and odors were generated in the City Laundry & Dry Cleaning Co. of Toledo, Ohio — difficulties common to all laundries.

SOLUTION: Two ILG 30″ Self-Cooled Motor Propeller Fans were installed to remove heat and provide general ventilation. A B35 ILG Direct-Connected Blower exhausts heat, steam, and air, direct from the ironing department. An ILG B21 Direct-Connected Blower introduces filtered fresh air into fur storage vaults, keeping room under pressure at all times. The incoming, filtered air is mixed with fumigant to kill moths.

RESULTS: Comfortable working conditions for employees are reported by the management. Relieved from stifling heat and humidity, production of entire plant is increased.

48" ILG Power Roof Ventilator installed immediately over the "press room".

Arrows indicate grilles leading from "press room" to roof ventilator.

Exterior of Crescent Puritan Laundry building improved by ILG Ventilation.

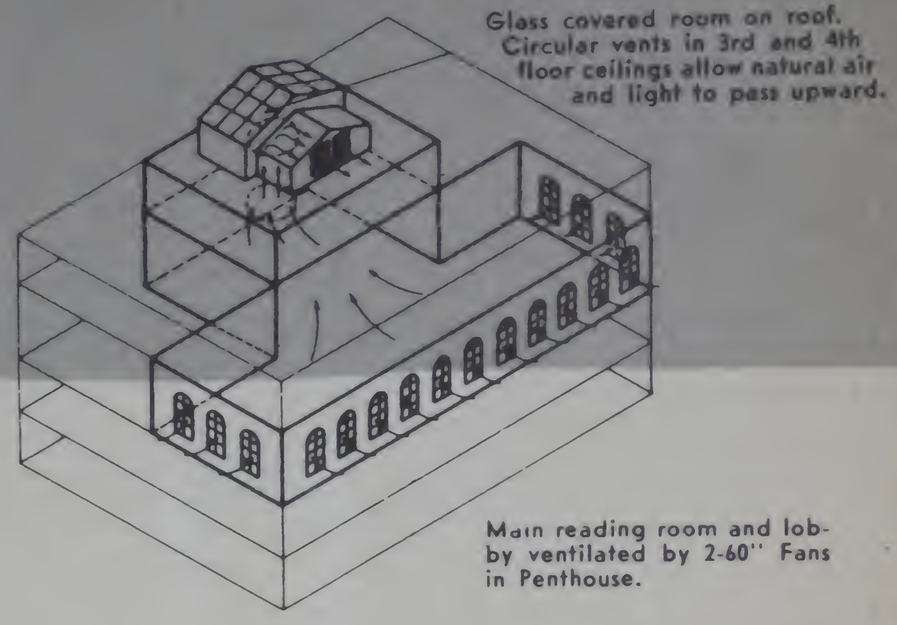
PROBLEM: Considerable labor turnover was experienced by the Crescent Puritan Laundry of Rochester, New York, due primarily to excessive heat and humidity.

SOLUTION: One 48" ILG Power Roof Ventilator (consisting of an ILG Self-Cooled Motor Propeller Fan in a Penthouse with Automatic Shutter) was installed directly over the "press room", the primary source of trouble. Two 36" ILG Self-Cooled Motor Propeller Fans were installed in other sections of the plant for "spot" ventilation.

RESULTS: Labor turnover in the Summer has been decreased, production has increased, working conditions have improved. In the Winter, condensation on the walls and ceiling has been ended.

Main reading room is provided with a two-minute air change.

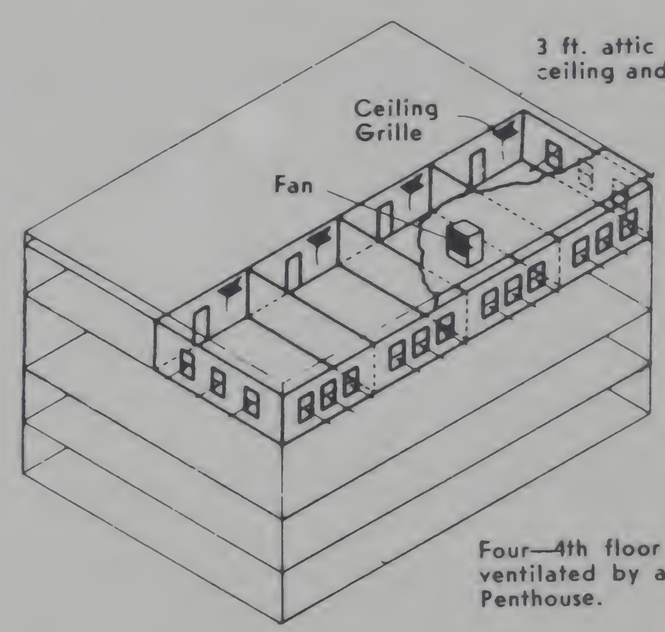
Library building now is adequately ventilated with ILG equipment. Schematic views at right indicate location of fans and direction of air flow.



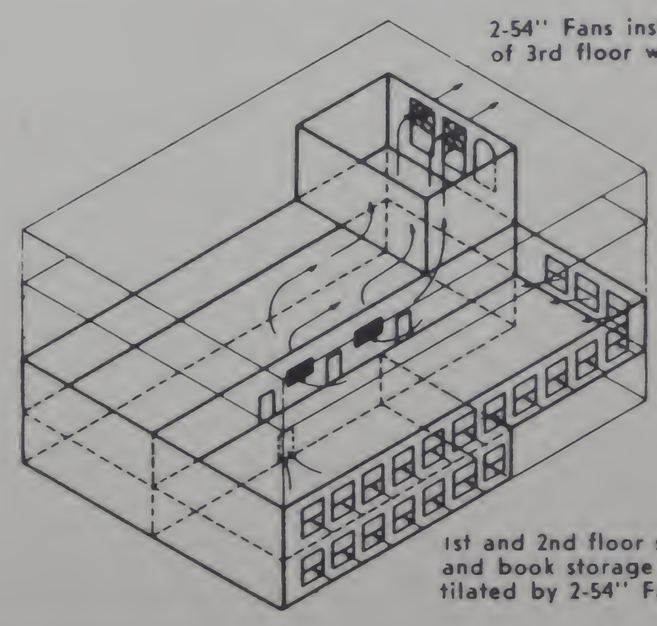
Main reading room and lobby ventilated by 2-60" Fans in Penthouse.

PROBLEM: To provide better air conditions in class and reading rooms in the library building at Peabody College, Nashville, Tennessee. In this building, four classrooms on the fourth floor were subjected to considerable sun heat.

SOLUTION: Two 60" ILG Self-Cooled Motor Propeller Fans provide a 2-minute air change in the main reading room. Air enters through windows, is drawn toward lobby, then up two floors into round penthouse openings, and out through fans. A 48" ILG Power Roof Ventilator over attic space pulls air in through windows of fourth floor classrooms, up through ceiling grilles, and out of attic. Two 54" ILG Self-Cooled Motor Propeller Fans in south windows on the third floor draw air in windows of first and second floor study rooms, through doors and grilles into book storage room, and up through stair well to third floor storage room where fans are installed.



Four—4th floor glass rooms ventilated by a 46" Fan in Penthouse.



1st and 2nd floor study rooms and book storage rooms ventilated by 2-54" Fans.

RESULTS: Student minds are more alert in air cooled surroundings. Formerly oppressive heat conditions in warm weather months no longer exist.

(Left) Interior view of typical reception room. Note grille in ceiling.

(Right) Location of ILG Power Roof Ventilators, two on each of five units comprising Medical Square.

PROBLEM: Five buildings comprising Medical Square, Los Angeles, contained 170 rooms to be ventilated — waiting rooms, doctor's offices, operating rooms, X-Ray rooms, laboratories, dark rooms, and rest rooms. With many inside rooms, it was necessary both to introduce fresh air and exhaust excessive heat, stale air, and odors, without "short-circuiting" the air or transferring odors from one room to another. In addition, provision had to be made to prevent carrying private conversation from one room to the others in the air change system.

SOLUTION: Two 24" ILG Power Roof Ventilators (consisting of ILG Self-Cooled Motor Propeller Fans in Penthouses with Automatic Shutters) were installed on each of the five buildings. Outside air is introduced through windows, circulated through the individual rooms, and pulled up through ceiling grilles into the attic space where it is exhausted. "Night Cooling" is handled by the maintenance crew, with fans turned on at midnight and allowed to run until morning. Fans are again turned on at noon to flush out accumulated heat, and, on excessively hot days, the fans run all day.

RESULTS: Rental agents report a seeming impossibility — complete satisfaction of the forty doctors who occupy the Square. The one-story buildings are now comfortable throughout the Summer.

Clinic Building at one end of complete group of Sanitarium buildings.

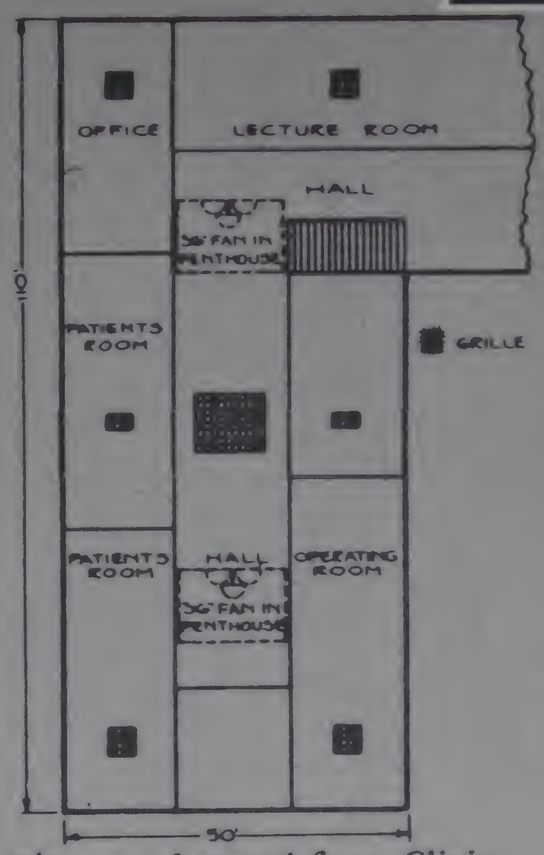


Diagram of second floor, Clinic Building, showing location of fans and grilles.

PROBLEM: Excessive heat, steam from sterilizers, and odors prevalent in medical institutions created a problem in the Clinic Building of the McCleary Sanitarium, Excelsior Springs, Missouri.

SOLUTION: Two 36" ILG Self-Cooled Motor Propeller Fans with Automatic Shutters were installed in Penthouses on the roof of the Clinic Building. During the day, outside air is drawn in through windows, pulled up through ceiling grilles, and exhausted by the fans. At night, when these second floor rooms are not in use, the grilles are closed, doors are opened, and cool night air sweeps through the building providing a fresh, cool atmosphere to start each day. In other buildings connected with the sanitarium, six 12" ILG Fans ventilate various offices and a 24" ILG Fan exhausts fumes from the kitchen.

RESULTS: In addition to air cooling second floor rooms and removing odors, steam, etc., the ILG Fans are powerful enough to draw air from the passage leading to the main building and from rooms on the lower floor.

(Above) Interior of Herff-Jones Co. second floor office which is air cooled with ILG equipment.

(Below) Roof view, indicating location of ILG Power Roof Ventilators.

(Above) Exterior view of the Indianapolis plant.

PROBLEM: In a second floor office of Herff-Jones Co., manufacturing jewelers and stationers of Indianapolis, Indiana, excessive heat seriously impeded employee efficiency.

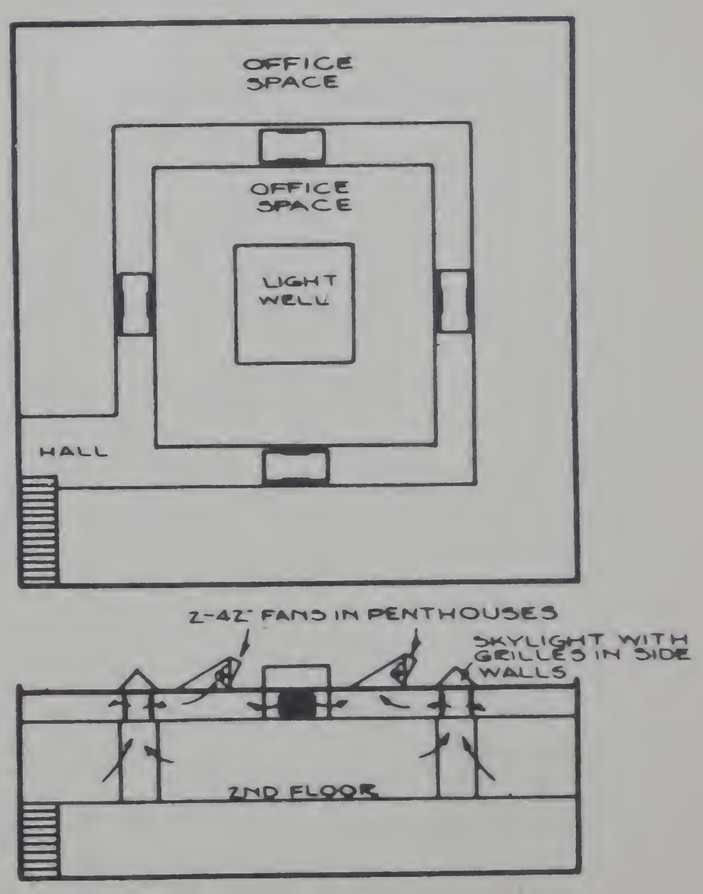
SOLUTION: Three 42" ILG Power Roof Ventilators (consisting of ILG Self-Cooled Motor Propeller Fans in Penthouses with Automatic Shutters) were located in the roof of the building. Outside air is drawn in through windows, breezed through the office, and pulled up through thirty-six ceiling grilles into the attic space where it is exhausted.

RESULTS: Mr. H. J. Herff, president, reports the system "increased the efficiency of our office 100% during the hot Summer days". Also, the units operate so quietly, no noise is heard in the office to disturb workers.

Exterior of remodeled Broadway Building, the first office building in Pasadena to be "air cooled".

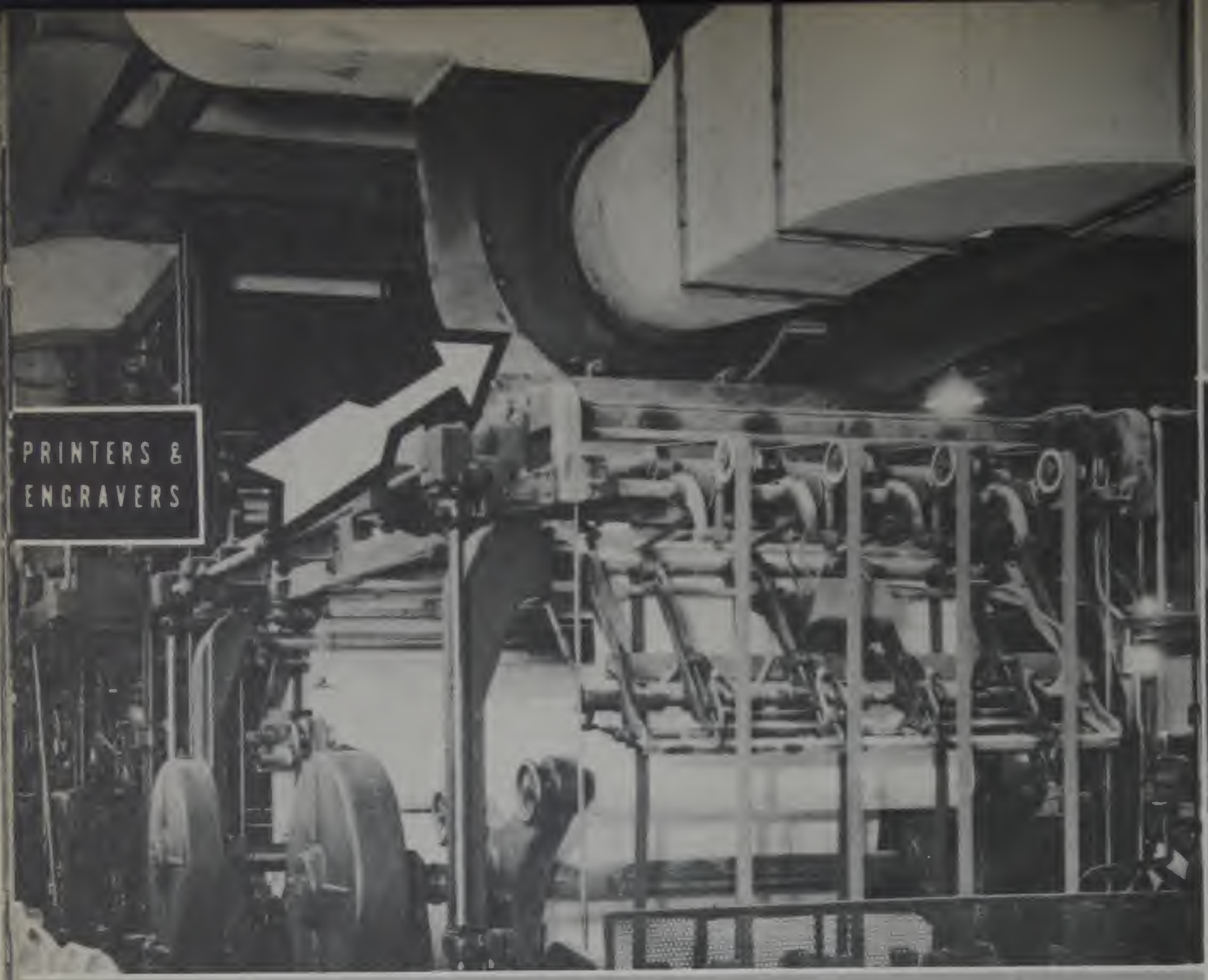
Hallway in office building, showing location of registers in skylight wells, leading to attic space.

PROBLEM: Remodeled after a fire, it was necessary to install ventilating equipment for the second floor offices of the Broadway Building of Pasadena, California. Excessive heat in Summer on this top floor accentuated the problem.



SOLUTION: Two 42" ILG Self-Cooled Motor Propeller Fans were installed in Penthouses on the roof to provide "Night Cooling". Actuated by a time clock, the fans turn on at night, draw in cool night air through windows, circulate it through the offices, and out through doors and transoms into the hallways. From there, through registers in the skylight wells, the air is pulled into the attic space and exhausted. Fans shut off at 4 A.M., then are started again at 2 P.M. to draw in outside air through windows on the shady side of the building. Insulated ceilings help retain coolness stored up from night operation for daytime comfort of office workers in the building.

RESULTS: Offices are now much cooler than before remodeling. Note rental agent sign on side of building featuring "air cooled" offices.



(Left) ILG BC Blower exhausting heat and fumes from press operations.

(Below) ILG BC Blower supplying fresh air to driers. Note compactness of installation.

(Right) Exterior of Cuneo Eastern Press, Inc. building.

PROBLEM: The Cuneo Eastern Press, Inc., of Philadelphia prints national magazines such as *Good Housekeeping, Cosmopolitan, Life, Time,* etc. on fast presses to meet definite deadlines. Air moving apparatus was required for forcing fresh air into the gas driers and to exhaust volatile oils and combustion fumes from the ink and gas.

SOLUTION: One ILG BC Direct-Connected Blower forces fresh air into the gas drier. Another ILG BC Blower exhausts heat, fumes, and volatile oils from the driers and press room. Fumes in the exhaust duct often are handled at a 300°F. temperature.

RESULTS: In an installation where failure of the ventilating equipment would have disastrous effects on tight production schedules, the ILG Blowers have operated at peak efficiency for more than six years and are expected to function continuously for many more years.

(Above) One section of engraving department showing ILG Blower installed on ceiling (possible only with direct-connected blowers). *(Upper Left)* Another section of department, showing construction of canopies and ducts. *(Left)* Exterior of newspaper publishing building.

PROBLEM: Fumes generated in the engraving department of the Springfield Newspapers, Inc., of Springfield, Ohio, had ill effects on employees. The fumes rose from several different processes, and it was necessary to collect and remove the gases as they were given off, before they had an opportunity to spread out to other parts of the building.

SOLUTION: An ILG BC40 Direct-Connected Blower was installed, complete with a duct system leading to canopies over each step in the engraving process. Fumes are pulled up into the system, right at their source, collected in the duct system, and quickly exhausted.

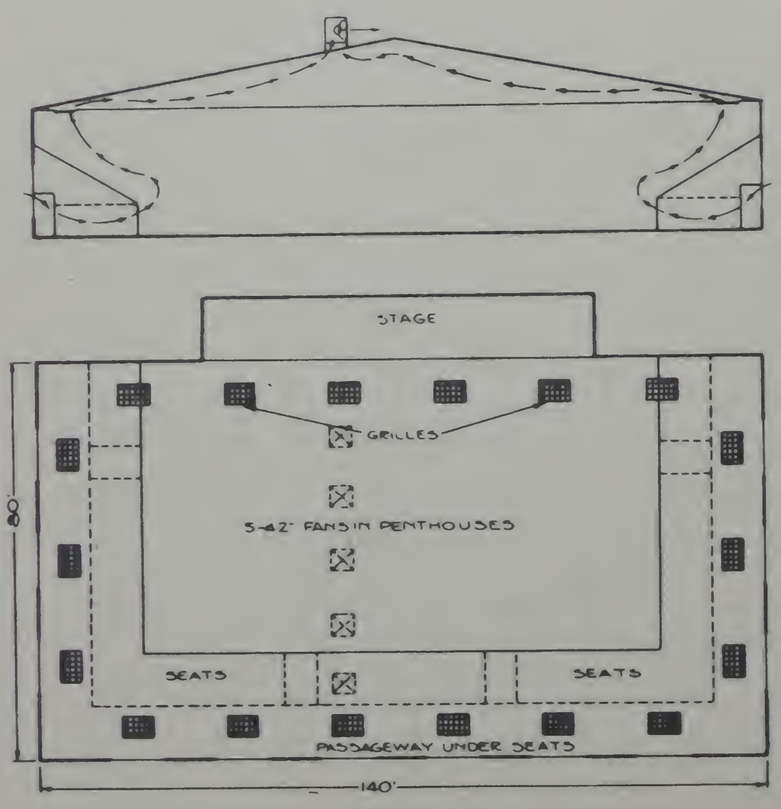
RESULTS: Employees work full schedules in definitely improved air conditions, without fear of ill effects from fumes. Labor relations are improved, production increased, accidents decreased, profits stepped-up. Results are particularly noticeable at peak periods, just before deadlines.

(Above) Roof view showing ILG Power Roof Ventilators.

Interior of auditorium, with arrows pointing to some of the ceiling grilles.

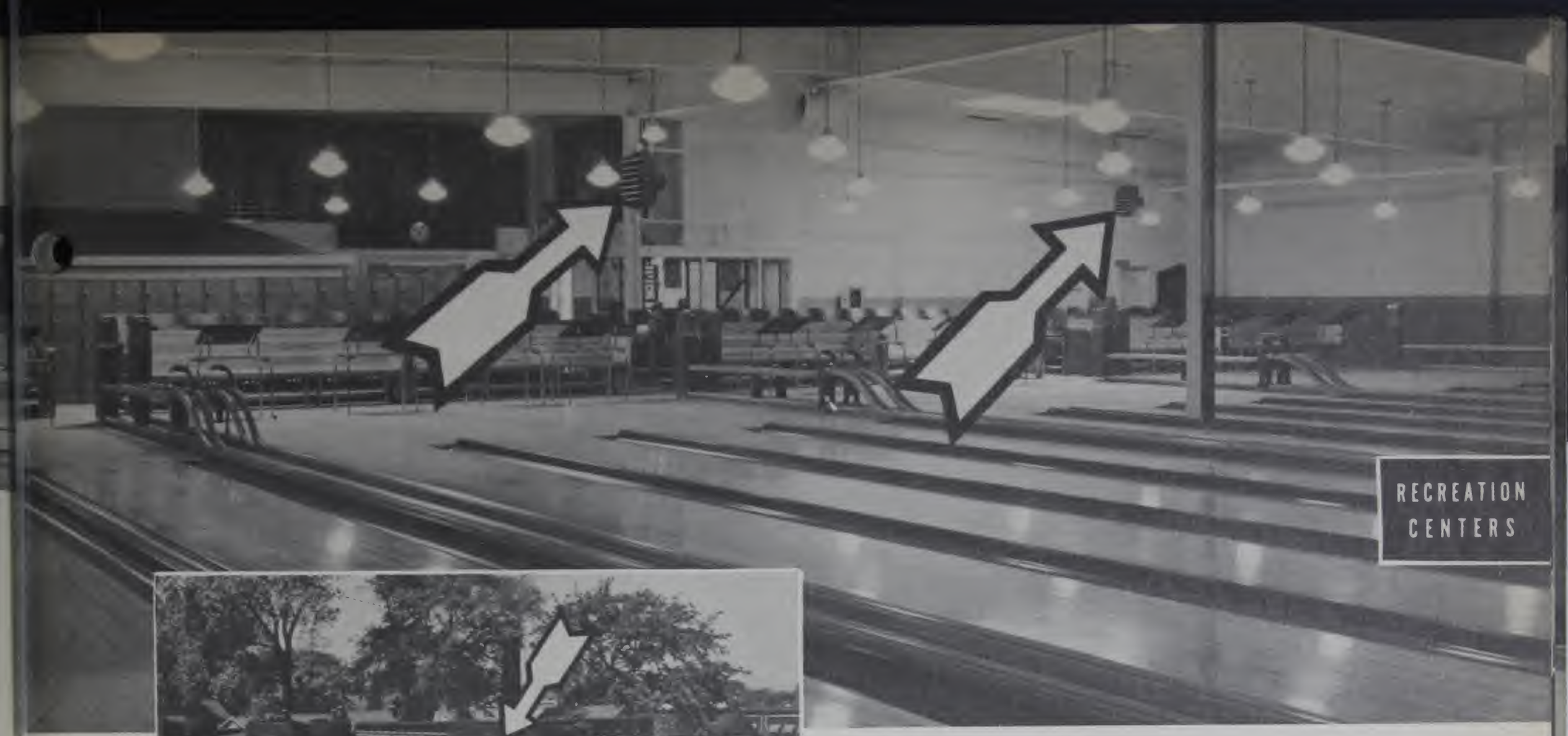
(Above) Exterior of the fine municipal hall in City of Independence.

PROBLEM: Memorial Hall, City of Independence, Missouri, has cubic content of 270,000 feet. Like all auditoriums, gymnasiums, banquet halls, etc., it was subject to the haze of tobacco smoke, odors, excessive heat and humidity which prevail when large numbers of people gather in poorly ventilated places. Quietness of operation and economy of operation and maintenance were considered important factors.

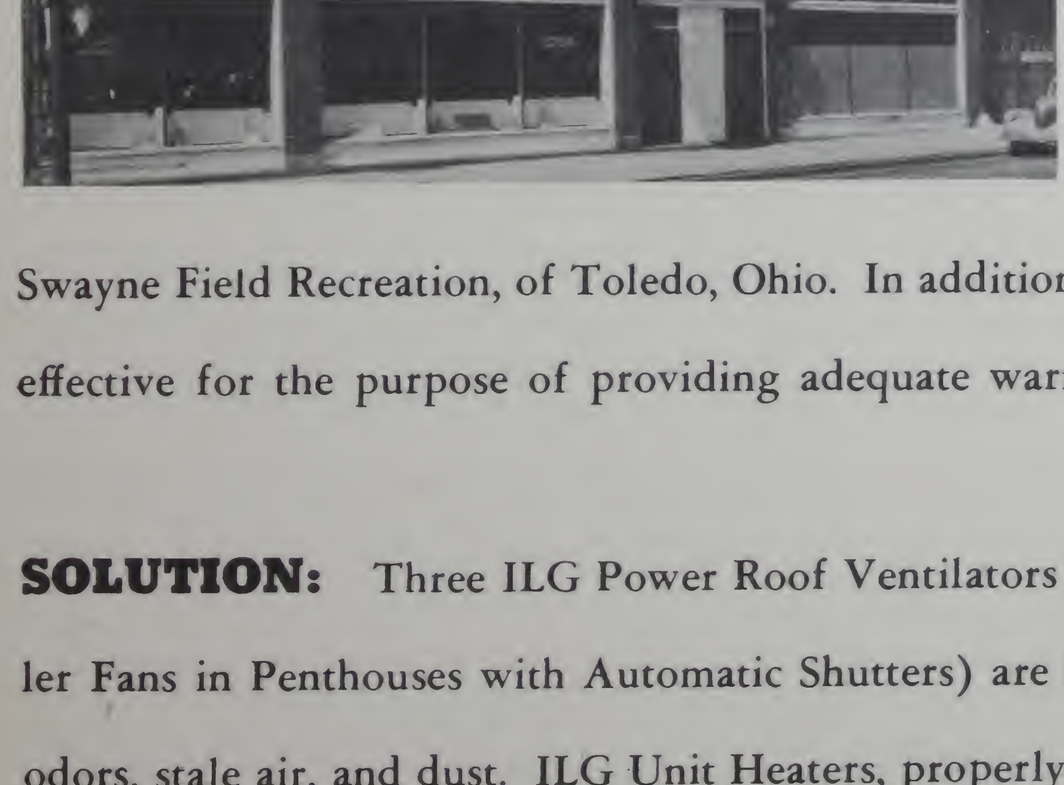


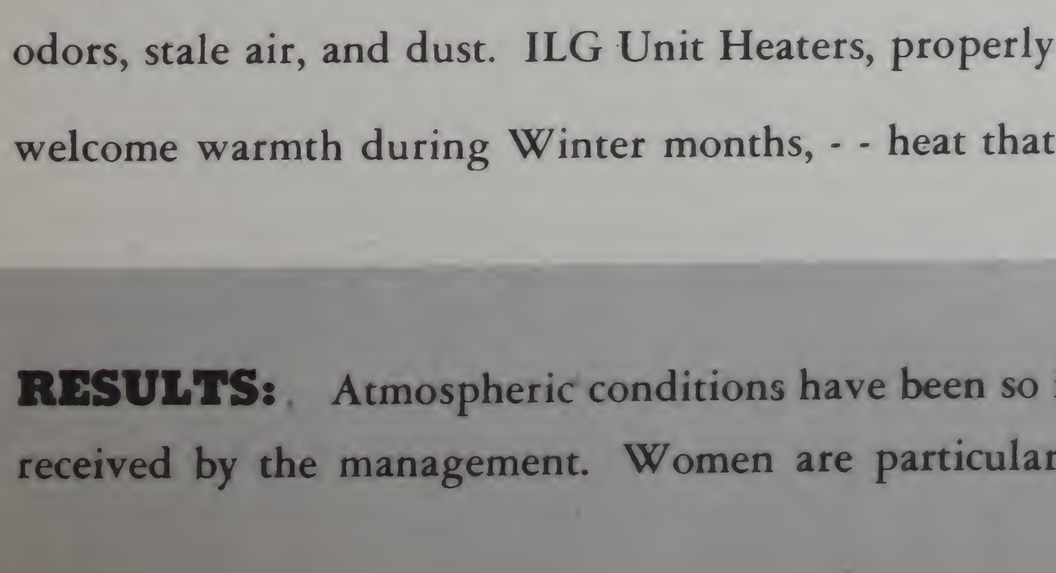
SOLUTION: Five 24" M ILG Power Roof Ventilators (consisting of Self-Cooled Motor Propeller Fans in Penthouses with Automatic Shutters) were installed to provide a 3-minute air change. Outside air is introduced through open windows and normal building openings, circulated through the hall, and drawn up through twenty-eight ceiling grilles into the attic space where it is quietly, efficiently, rapidly exhausted.

RESULTS: "Second-hand" air, smoke, odors, and excessive heat are quickly removed and replaced with fresh, cool, outside air, providing vital healthful conditions required in crowded halls.



RECREATION CENTERS





(Above) General view of alleys, showing two of the ILG Unit Heaters, also ceiling grilles through which bad air is exhausted.

(Upper Left) Roof view with close-up of one ILG Power Roof Ventilator.

(Lower Left) Exterior of popular Toledo recreation center.

PROBLEM: Smoking by patrons, plus the stale air, excessive heat, odors, and dust developed in bowling establishments confronted the proprietor of Swayne Field Recreation, of Toledo, Ohio. In addition, a central blast heating system had proved ineffective for the purpose of providing adequate warmth for bowlers in the Wintertime.

SOLUTION: Three ILG Power Roof Ventilators (consisting of ILG Self-Cooled Motor Propeller Fans in Penthouses with Automatic Shutters) are installed on the roof to swiftly exhaust smoke, odors, stale air, and dust. ILG Unit Heaters, properly spaced throughout the recreation hall, provide welcome warmth during Winter months, - - heat that is under complete control.

RESULTS: Atmospheric conditions have been so improved that frequent compliments have been received by the management. Women are particularly appreciative of the inviting air conditions.

(Above) "Ilgvent" Built-in Kitchen Ventilator for small kitchens.

(Below) "Package-Type" model for installation in steel sash or other type of window.

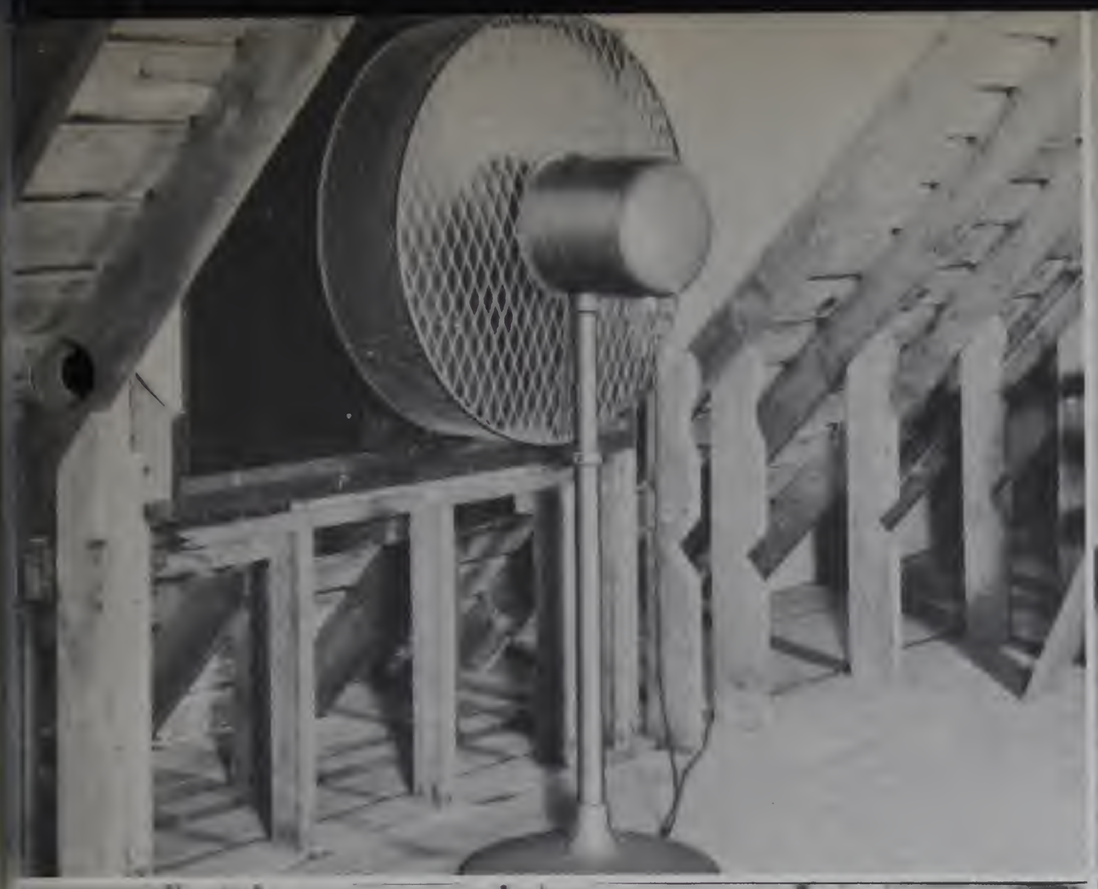
(Above) "Ilgette" Built-in model for average kitchens.

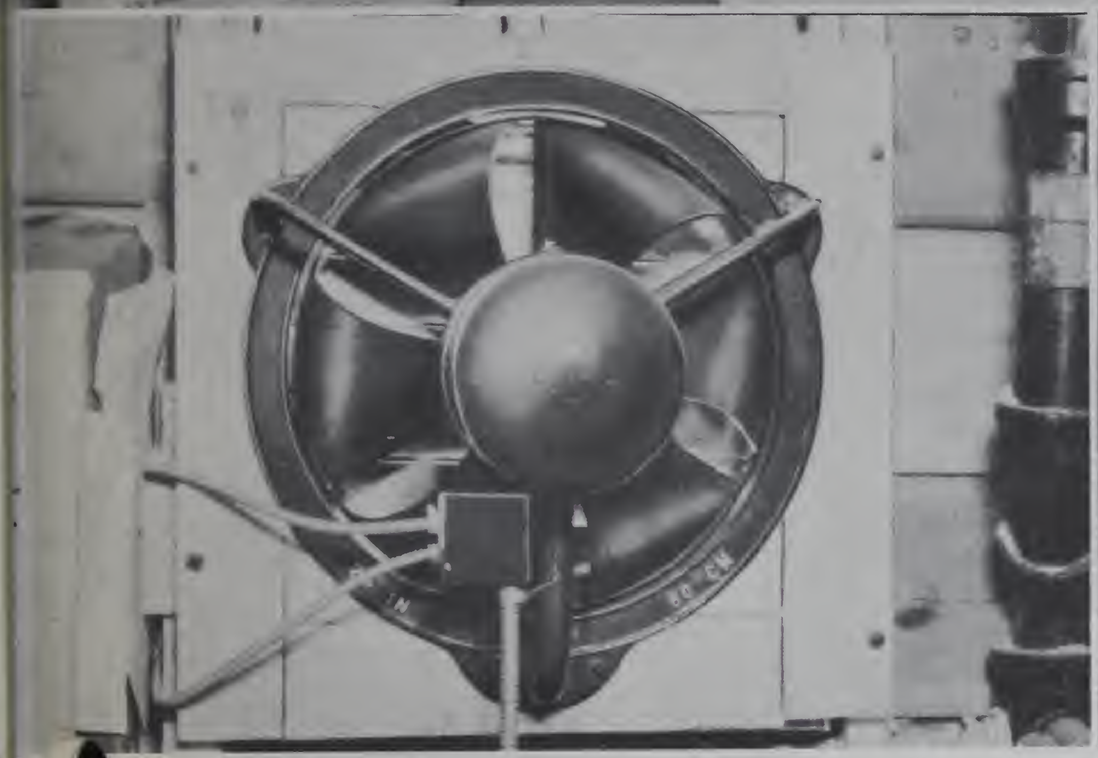
(Below) "Portable" model for rented homes or apartments

PROBLEM: In a laboratory report made by the U. S. Testing Co., it was determined that in an average American home where typical menus are prepared for a family of four, over 403 lbs. of "greasy grime" are given off in cooking operations during the course of a year. The "greasy grime" consisted of a mixture of water, volatile oils and fats, plus carbonaceous soot or smoke. Unless removed from the home, this "greasy grime" was carried by air currents throughout the building to deposit on draperies, woodwork, curtains, wallpaper, etc. In addition, stale cooking odors permeated rooms, furnishings, and clothing.

SOLUTION: Installation of ILG Kitchen Ventilating Fans to remove "greasy grime" and odors right at their source, in the kitchen. Models are available for permanent or temporary installation in all sizes and types of kitchens, in attractive designs to harmonize with all decorative plans.

RESULTS: ILG Kitchen Ventilators have proved powerful enough not only to remove "greasy grime" and cooking odors from the kitchen, but also to remove stale air and tobacco smoke from adjoining rooms. Cleaning and decorating bills are held to a minimum.





RESIDENTIAL

(Upper) Ilgwind model at attic window. Heat is drawn up through stairway or ceiling registers.

(Lower) ILG Self-Cooled Motor Propeller Fan installed permanently in attic wall.

(Upper) "Ilg-Rollaire" model at dining room window. All ILG models are remarkably quiet—free from whine or "air noise".

(Lower) Diagram illustrating operation of "Night Cooling" system.

PROBLEM: During hot Summer days, like sponges soaking up moisture, homes and apartments soak up sun heat until the temperature often reaches 135° in the attic. Unless removed, this blanket of heat radiates down into living quarters, saturating walls, floors, ceilings, furnishings. Even though outside temperature drops 25 to 35° at sundown, the heat load is retained and gradually is given off, making rooms unbearably hot until early morning hours.

SOLUTION: ILG Night Cooling Fans may be either permanently built into the attic walls, or portable models may be plugged-in in the attic, or at any hallroom, bedroom, or living-room window. By opening windows wide and starting the fan, a cross-circulation of air develops which quickly drives the sweltering blanket of daytime heat out of one window and pulls in cool, refreshing night-time air through other windows. Temperature rapidly drops from 5 to 20° for indoor comfort and peaceful sleeping. Exceptionally quiet operation makes possible the moving of great quantities of air without irritating noise.

RESULTS: Owners report that ILG "Night Cooling" is man's closest approach to "Shade-Tree" comfort at a cost that every family can easily afford.

"Ilgairator" installed in a living room window.

Night air is freed from ill effects by the "Ilgairator".

PROBLEM: Individuals afflicted with respiratory disorders frequently find relief when dust, soot, and plant pollens are filtered from the air. In large cities, open windows invite dust, soot, and street noises. In practically all homes, apartments, offices, hospitals, etc., it is often desirable to introduce fresh air without drafts.

SOLUTION: A filter-type "Ilgairator" can be quickly installed in any sliding sash window, to supply fresh air from which 98% of the dust, soot, and plant pollens have been removed. Air volume is controlled by a regulator on the front panel. Air direction can be changed at will by revolving the "No-Draft" grille. Street noises are minimized. There is practically no operation noise as the motor floats on a sound-absorbing bracket.

RESULTS: Fresh air supply is completely under control; free from elements which are injurious to health, aggravate respiratory disorders, and cause discomfort. Low-cost units are styled to harmonize with modern interiors.

Attractive, modern architectural design is the keynote of Schrafft's; 61 Fifth Avenue, New York City. *(Above)* Dining room. *(Upper Left)* Exterior. *(Lower Left)* Two of six ILG Blowers installed.

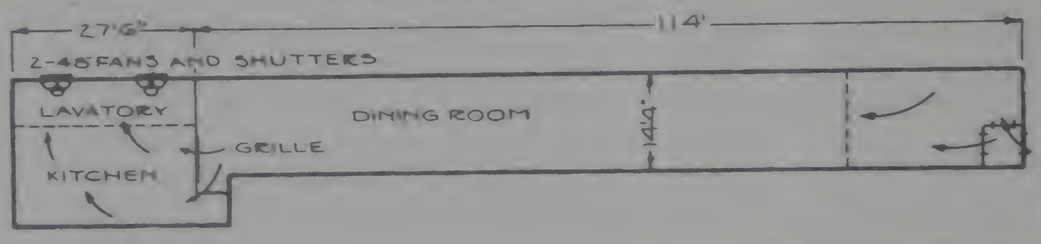
PROBLEM: The Frank G. Shattuck Company, operators of the Schrafft Stores, have the problem common in all quality dining rooms of supplying fresh, appetite-stimulating air to patrons and exhausting smoke, heat, stale air, and odors.

SOLUTION: In the distinguished Schrafft's store located at 61 Fifth Avenue, New York City, and pictured above, six ILG Direct-Connected Blowers with three-phase motors and variable air controllers have been installed to handle the air all the way from its introduction through final exhaust. Special provisions have been made to handle critical areas, such as the kitchen, in order to quickly remove fumes and odors. This is one of forty-four Schrafft Stores, most of which have been similarly ILG-equipped.

RESULTS: The Frank G. Shattuck Company has found it good business to keep air conditions on an equally high level with the fine food and luxurious surroundings provided for its patrons.

RESTAURANTS

(Upper Left) Grilles through which air is drawn into kitchen. *(Upper Right)* Interior view of popular restaurant. *(Right)* ILG Fans installed in kitchen.

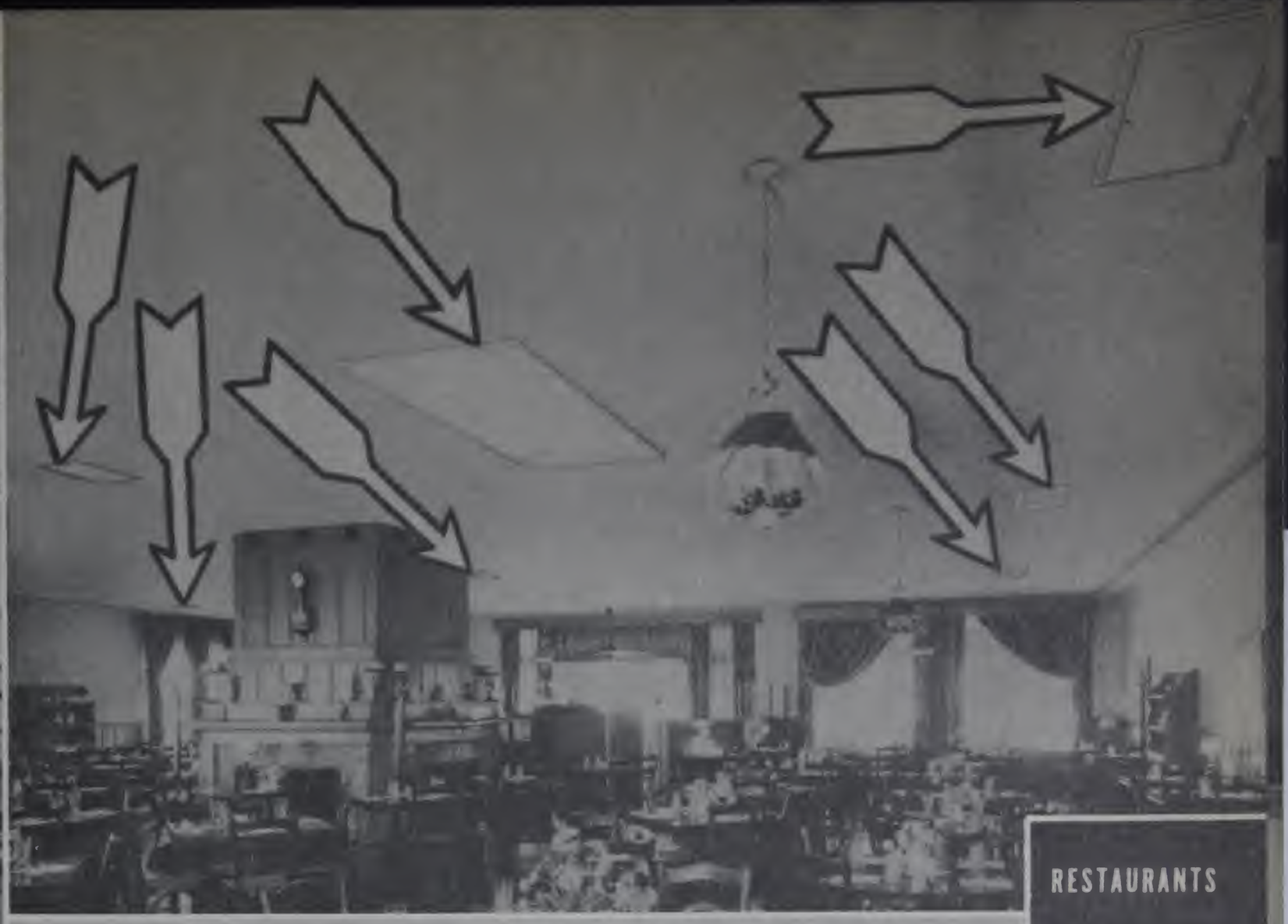


PROBLEM: Cooking odors, heat, and greasy fumes, as well as excessive heat generated by lights, coffee urns, etc., required removal from the Junior Lunch Room operated by Linton's Lunch, Philadelphia. This restaurant with its colorful interior, stainless metal furnishings, and ultra-modern lighting is a show-place of the food service field.

SOLUTION: Two 48" ILG Self-Cooled Motor Propeller Fans with Automatic Shutters provide a 1½-minute air change. Fresh outside air is drawn in from the front of the restaurant, swept through the entire length of the dining room, drawn through grilles into the kitchen where it is swiftly exhausted, along with excessive heat, smoke, stale air, cooking fumes, and odors. High velocity of air movement creates a definite cooling effect.

RESULTS: The management reports highly satisfactory results with this system, and similar installations have been made in many of the restaurants in the chain.

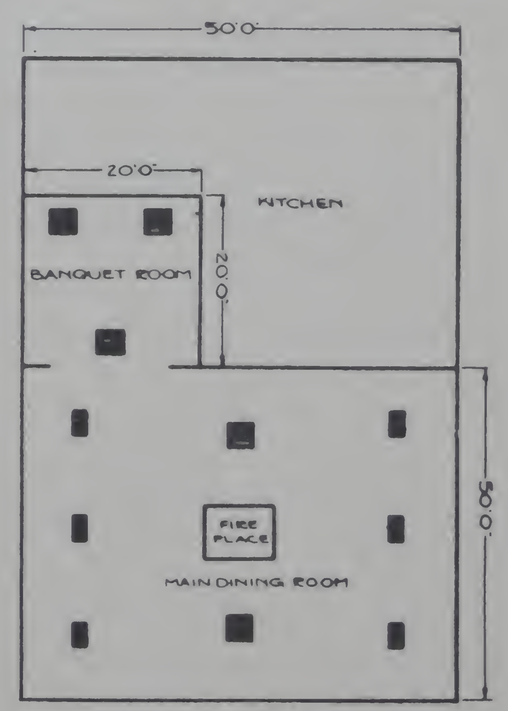
Exterior of Tick Tock Tea Room, frequented by many Hollywood celebrities.

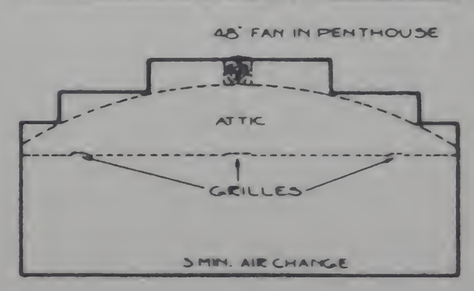


(Above) Interior view, with arrows pointing to ceiling grilles. *(Left)* ILG Fan installed in penthouse on roof.

PROBLEM: The Tick Tock Tea Room, exclusive Hollywood rendezvous, enjoys its heaviest traffic at late afternoon and early evening, a time when the restaurant became extremely warm.

SOLUTION: One 48" ILG Self-Cooled Motor Propeller Fan was installed in a Penthouse on the roof to provide a 3-minute air change. Accumulated heat, smoke, stagnant air, etc., is drawn up through ceiling grilles into the attic space, from which it is quickly exhausted. Every part of the tea room is equally ventilated and cooled by this method.





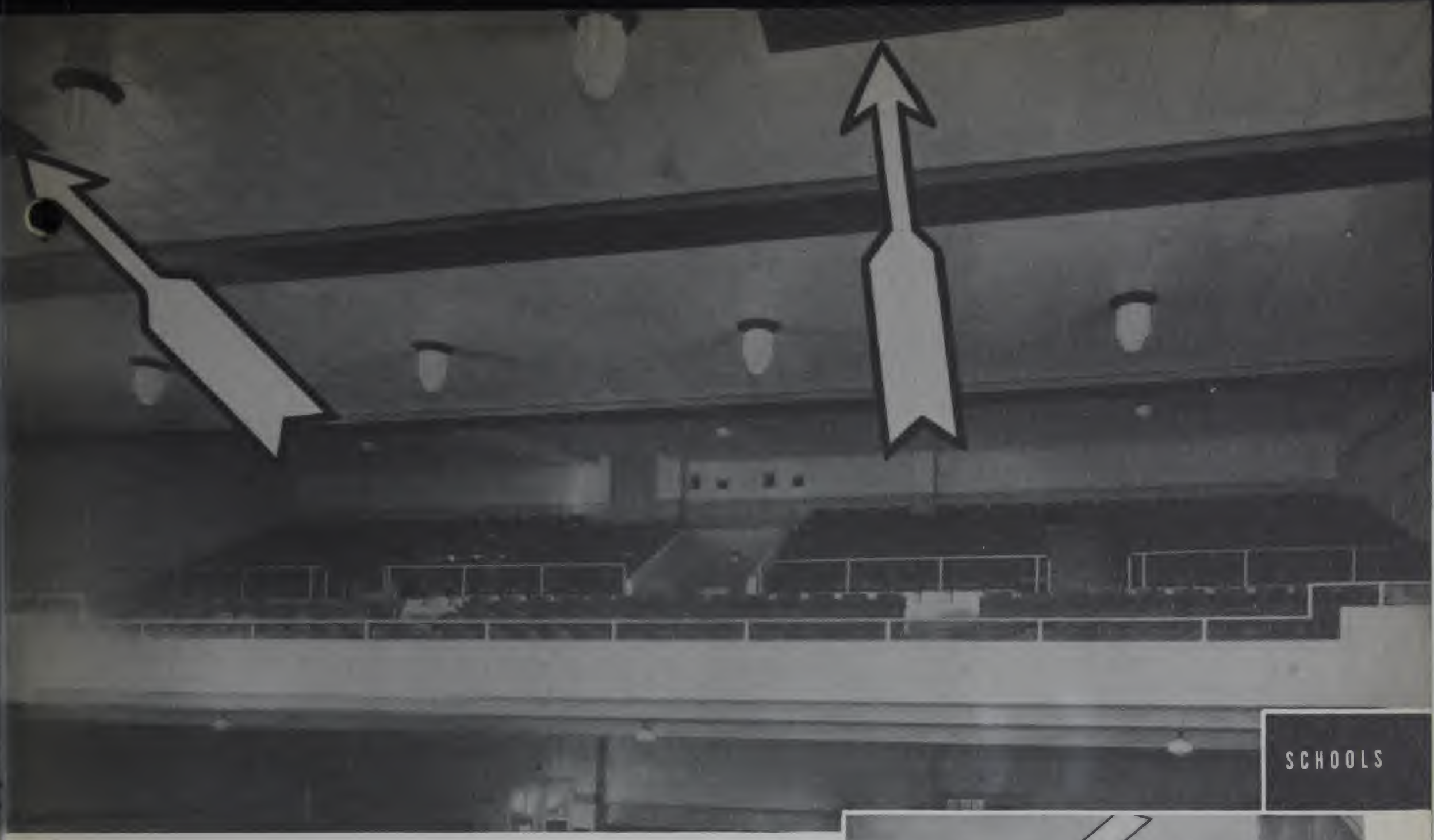
RESULTS: The fresher, cooler air has been so noticeable that patrons have inquired about the new "air conditioning" system. On hot Summer days, the new ILG system has definitely had "box office" appeal.

Exterior of Holy Name of Jesus School, Calhoun Street, New Orleans, completed in 1932.

Assembly room, with arrows pointing to ILG Unit Heaters installed near ceiling. Warm air is forced down into the "Vital Zone" where students work and play.

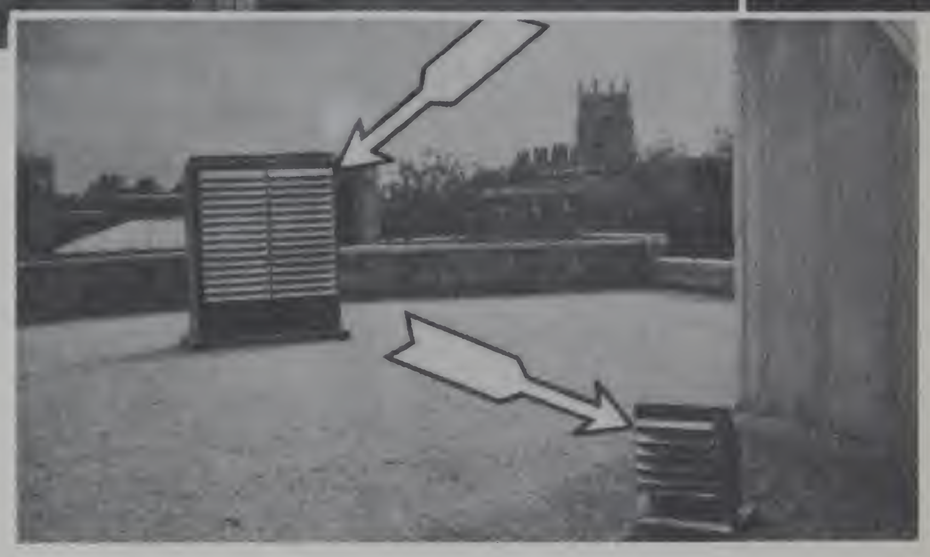
PROBLEM: A complete ventilating and heating job was required for the modern Holy Name of Jesus School at New Orleans, Louisiana, using methods typical of scores of similar installations made throughout the nation with ILG Sensible Ventilation and ILG Unit Heaters. Various bad air conditions common to all schools were encountered, including stagnant air, odors, steam, and fumes, as well as that of Wintertime heating. The objective was obvious — to provide pupils with year 'round healthful air conditions.

RESULTS: The heating and ventilating system pictured here has proved to be thoroughly effective and extremely practical. Comfortable, healthful air conditions are maintained the year 'round. The first cost was low, installation was simple, operating and maintenance costs are at a minimum.



Auditorium, in which hot, stale air is drawn up through ceiling grilles to attic for exhaust by ILG Fan.

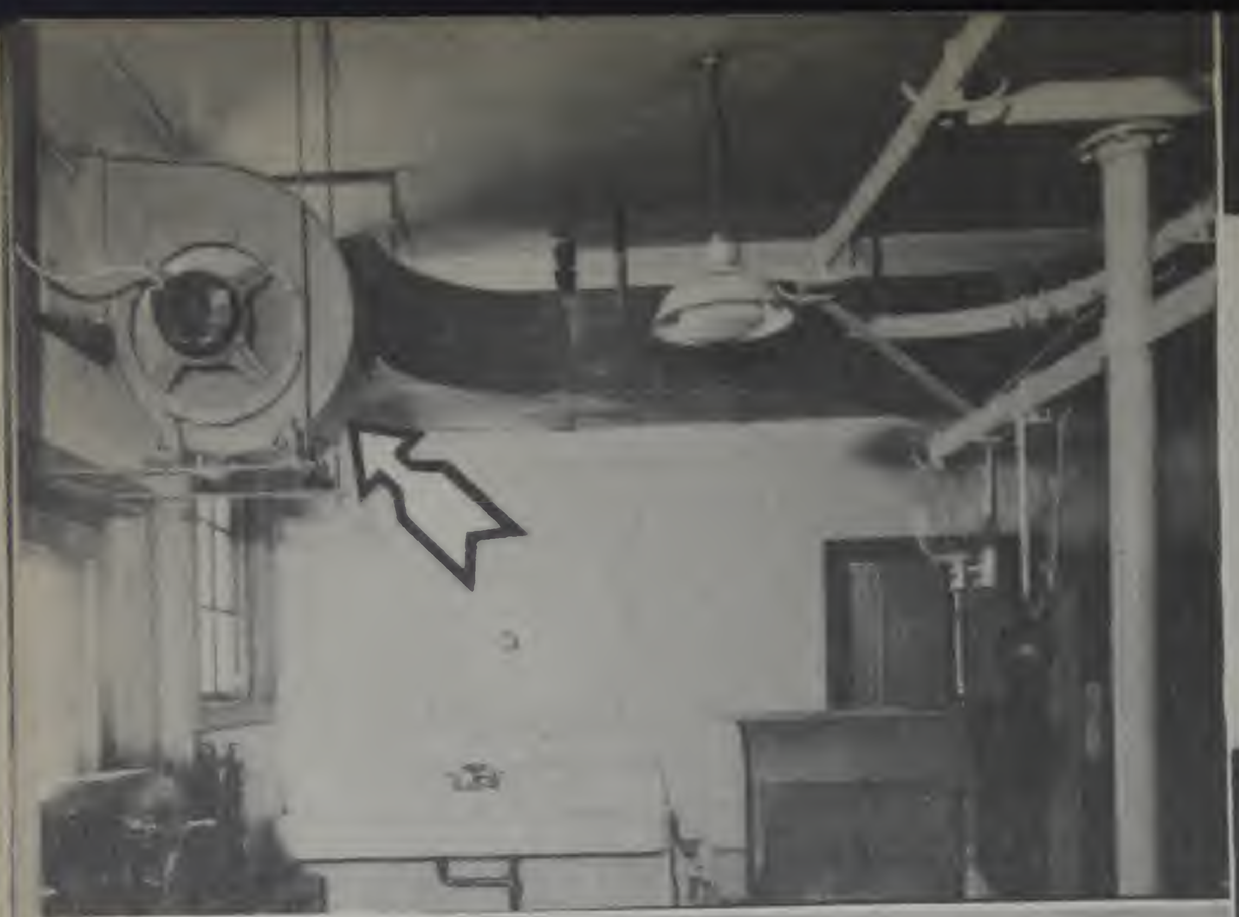
SOLUTION: Eight No. 13 and four No. 17 ILG Unit Heaters were installed in the boys' and girls' toilets, cafeteria, office, convocation rooms, and main entrance. One 72" ILG Power Roof Ventilator over the auditorium provided ideal air conditions for that large area. One 12" ILG Power Roof Ventilator exhausted heat and fumes from the moving picture projection booth. 24" ILG Self-Cooled Motor Propeller Fans removed heat, fumes, and odors from the kitchen and cafeteria. 18" Fans removed steam and odors from the boys' and girls' toilets.

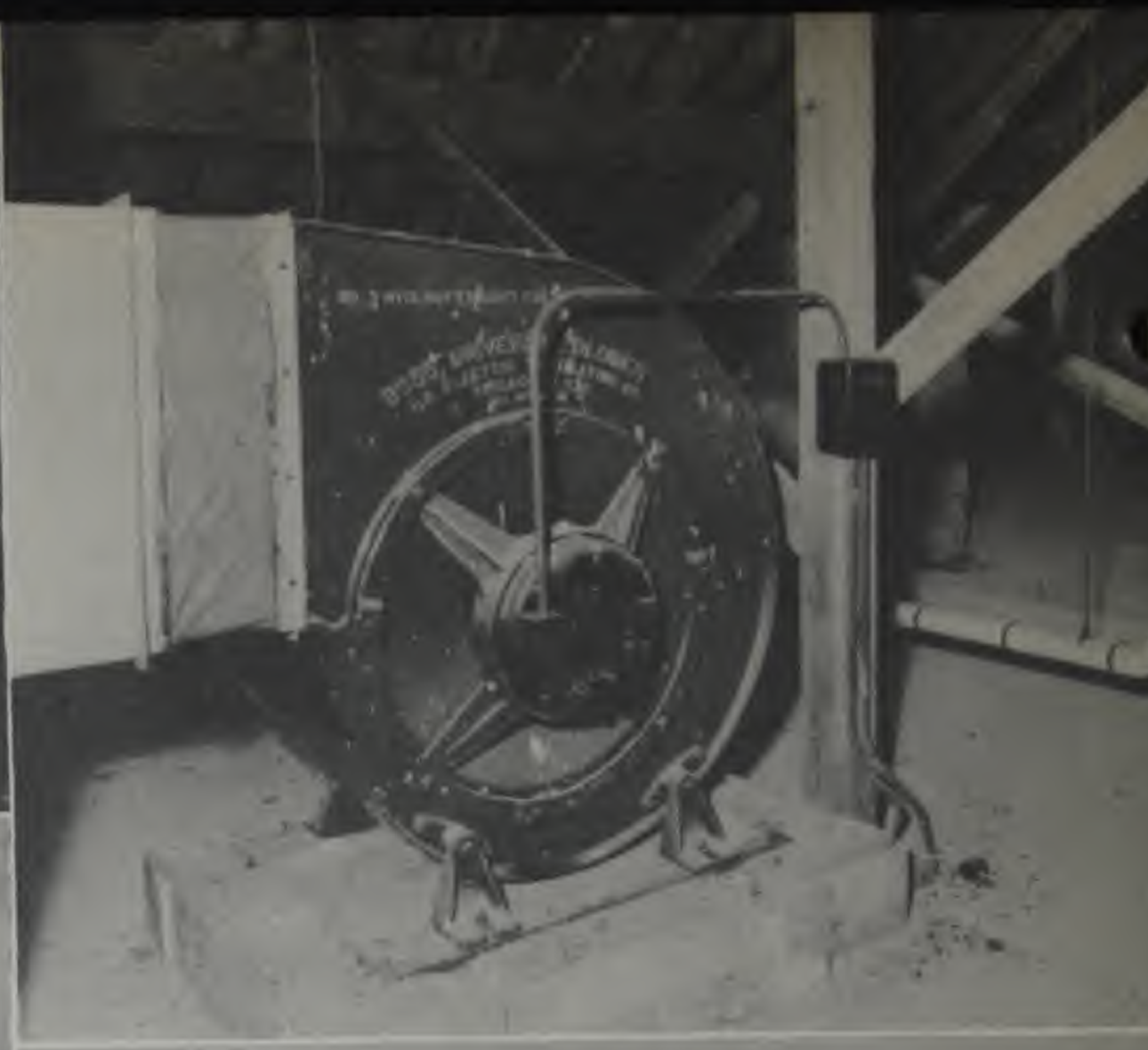


72" and 12" Power Roof Ventilators which ventilate auditorium and projection booth.

24" ILG Fan removes heat and stale air from lunch room. Another 24" ILG Fan ventilates kitchen.

NOTES: Although ILG equipment is located at selected points throughout the building, no difficulty is experienced with noise of operation. In fact, ILG Unit Heaters and Propeller Fans operate so quietly, students and faculty are rarely aware that they are running.





SCHOOLS

(Upper Left) ILG Blower installed in kitchen. *(Lower Left)* Exterior of Junior Rivers High School. *(Above)* ILG Blower exhausting from biology room.

PROBLEM: Recently completed Junior Rivers High School, Charleston, South Carolina, required "spot" ventilation at several critical points.

SOLUTION: ILG Direct-Connected Universal Blowers were favored for these applications. One ILG BC35 removes cooking heat, fumes, and odors from the kitchen of the cafeteria; an ILG BC55 removes odors and stale air from the biology room; an ILG BC50 exhausts heat, smoke, and odors from the cooking room; and an ILG BC40 removes heat and stagnant air from the home arts room. A 36" ILG Self-Cooled Motor Propeller Fan exhausts heat, humidity, and odors from the auditorium.

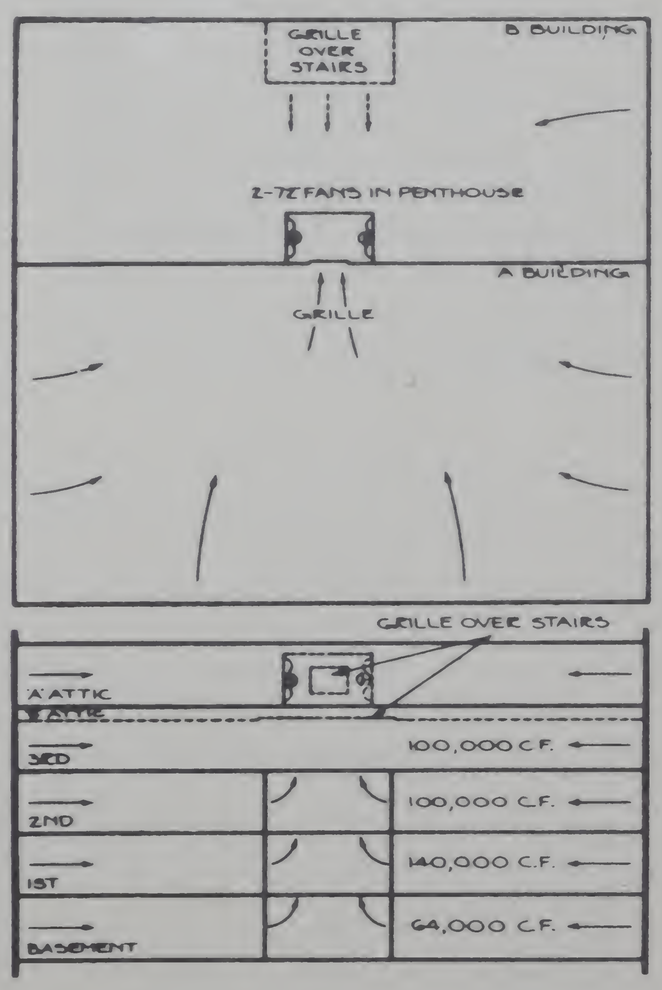
RESULTS: Students work and play in an agreeable healthful atmosphere. Original cost of equipment was low, operating and maintenance costs are easy on the school budget.

(Above) Third floor sales room with arrow pointing to grille over stairs. *(Upper Right)* ILG Fans installed in Penthouse. *(Lower Right)* Exterior view of popular department store.

STORES

PROBLEM: General ventilation for year 'round purposes, plus "Night Cooling" for hot Summer months in the L. L. Stearns & Sons department store of Williamsport, Pennsylvania.

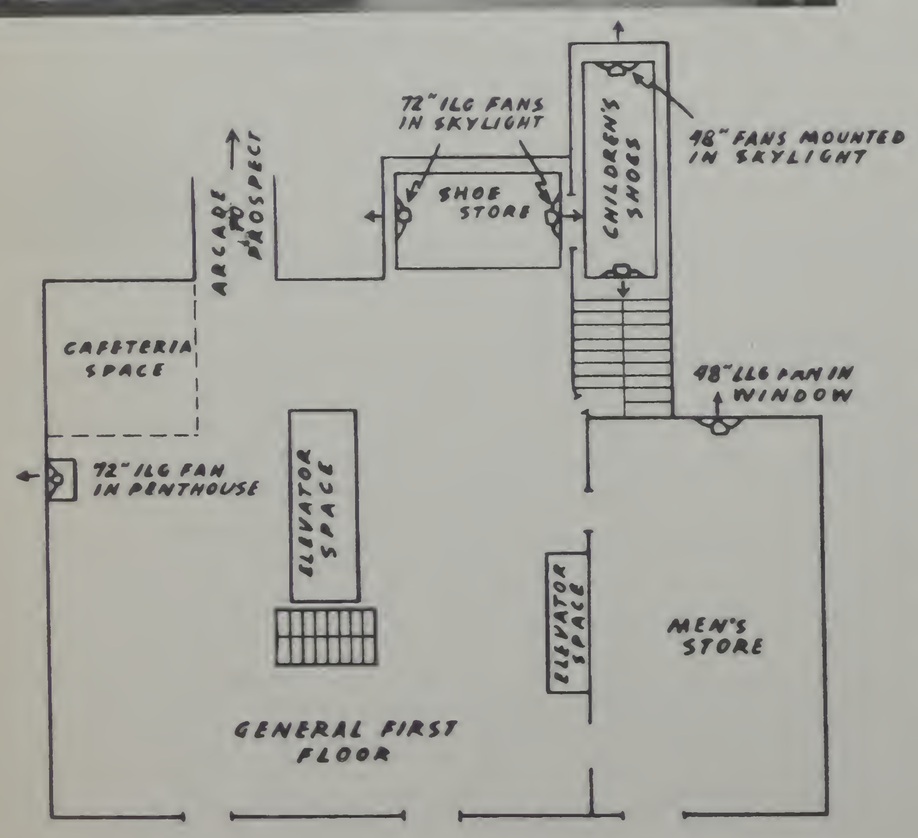
SOLUTION: Two 72" ILG Self-Cooled Motor Propeller Fans with Automatic Shutters were installed in a Penthouse on the roof, with combined capacity of 80,000 cubic feet of air per minute. During Winter months, fans are operated several times each day to improve air conditions without causing drafts. For "Night Cooling" in Summer, one floor is cooled at a time, drawing cool nighttime air in through open windows and up stair well. After a 2½-hour cooling period, doors on that floor are closed and the process repeated on another floor. Thus, the whole building is easily cooled during the night, and a 10° lower temperature is obtained in the store during the day.



"B" building is one story lower than "A" building. A grille in side of Penthouse permits air to be drawn from attic and floors below of building "A".

RESULTS: Geo. L. Stearns, vice-president, says: "Results are amazing when we consider the small expenditure, together with the fact that a total of 6 H.P. is all that is required to operate the system".

(Above) 72" ILG Fan in Penthouse on roof.
(Below) Rapid Air Change is provided in these long, brightly-lighted aisles.



PROBLEM: The Wm. Taylor Son & Co., one of Cleveland's leading department stores, is modern, efficiently laid out, with plenty of eye-appeal. But, like all stores catering to the public, it has had the problem of meeting the demand for shopping comfort, especially in hot weather. Several factors — the very size of the establishment, the heat condition created by brilliant lighting, and the heavy floor traffic — combined to accentuate the problem. After comparing costs and learning that ILG "Sensible Ventilation" would total about 1/4 to 1/3 the cost of air conditioning, it was decided to install ILG equipment.

SOLUTION: Six ILG Self-Cooled Motor Propeller Fans— three 72" and three 48"— with a total capacity of 174,000 cubic feet per minute — were installed as shown in the diagram at left. These provide an adequate, continuous 4-minute air change on the Main Floor and in the Men's Furnishing Section. The tremendous volume of air — moved in the simplest possible way — results in an inviting "air cooling" effect throughout the entire area. It should be noted that this scientifically controlled system of air change serves to comfort the shopper psychologically as well as physically.

RESULTS: The installation proved very satisfactory from the standpoint of both management and customers according to a letter received from H. R. Wells, general superintendent. Other ILG equipment has been in use in the store over the past twenty-five years.

Two ILG Power Roof Ventilators (one 36" and one 42") installed on the roof of typical Weinberger Drug Store. 20" ILG Self-Cooled Motor Propeller Fan not illustrated.

Interior of store showing ceiling grilles through which excessive heat, smoke, odors, and stagnant air are pulled up for exhaust through ILG Fans. Shopper comfort increases patronage . . . employee comfort steps-up efficiency.

STORES

PROBLEM: The Weinberger Drug Stores, Inc., with headquarters in Cleveland, Ohio, sought a means of cooling the various stores in its chain for Summertime comfort of shoppers and employees.

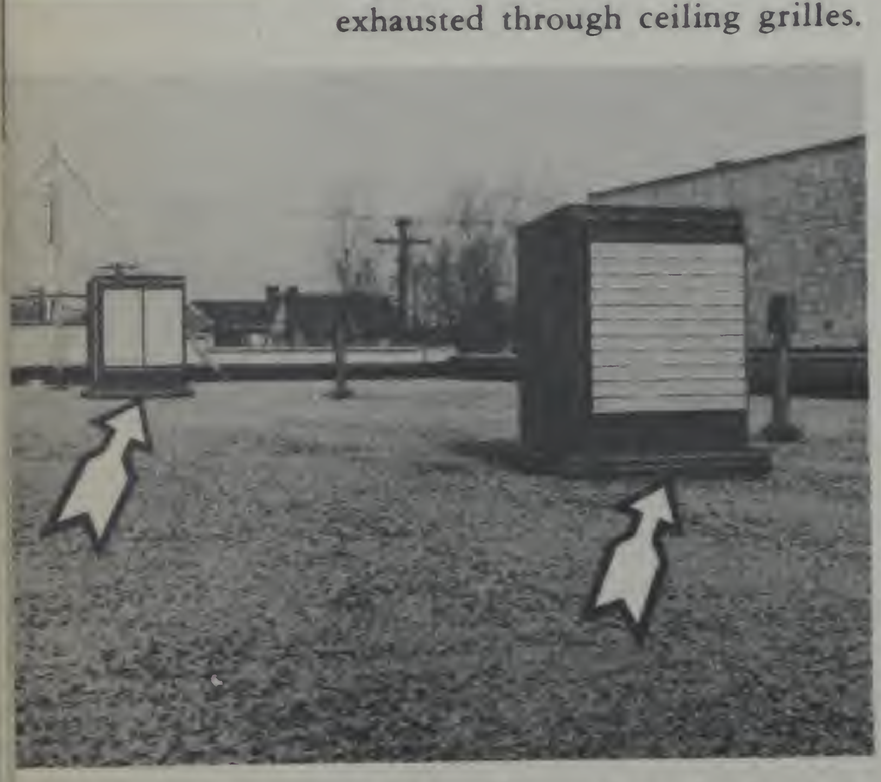
SOLUTION: After experimenting with several types of cooling systems, ILG Sensible Ventilation was adopted for the thirty stores in Cleveland, Mansfield, Youngstown, Wooster, Steubenville, Bexley, Columbus, Sandusky, and Alliance, Ohio. Equipment for each store was similar to that illustrated above at 11638 Detroit Avenue in Cleveland, consisting of ILG Power Roof Ventilators (ILG Self-Cooled Motor Propeller Fans in Penthouses with Automatic Shutters) where roof installations were feasible, ILG Self-Cooled Motor Propeller Fans for window or wall installations, or a combination of both.

RESULTS: After the first Summer of rapid air change operation, the management was delighted with the results, from both a practical and economical standpoint. Rapid air change cools each store, simultaneously removing odors, stagnant air, and heat.

(Right) Modern front of Albers Super Market in Cincinnati, Ohio.

STORES

(Above) Sun heat, odors, stale air, plus heat generated by store lighting and heavy store traffic, are exhausted through ceiling grilles.



ILG Power Roof Ventilators draw fresh air in through open doors and windows, circulate it through the store, and pull it up through ceiling grilles pictured above.

PROBLEM: Operators of Albers Super Markets, Inc., with headquarters in Cincinnati, Ohio, have sought the best possible means of obtaining most attractive shopping conditions in the various stores of the chain. In addition to elimination of odors, smoke, and stagnant air, it was necessary to remove the excessive heat created by brilliant lighting, heavy store traffic, and heat radiated down into the stores from the roof.

SOLUTION: Long time users of ILG equipment, Albers standardized on ILG Sensible Ventilation in all new stores and in buildings altered for use by the chain. Rapid air change has resulted in pleasant, business-stimulating patronage, as well as an increase in employee efficiency and health.

RESULTS: W. H. Albers, president, lists some of the reasons for this preference in this quotation from a letter: "We have had no maintenance trouble since the first ILG Fans were installed a number of years ago, and in addition, they are quiet and very economical to run."

Exterior of side-by-side stores ventilated by ILG.

PROBLEM: To provide rapid air change in adjoining stores, the Model Drug Store and a unit of the Steiden Stores in Louisville, Ky.

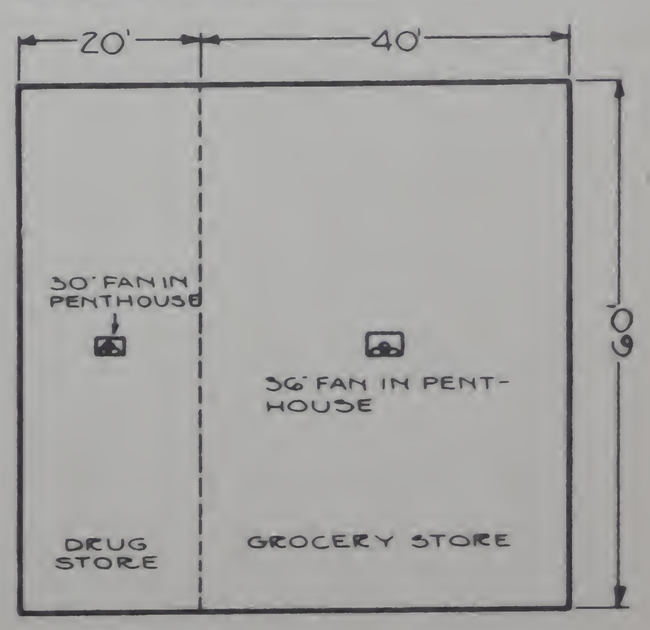
SOLUTION: One 30" ILG Power Roof Ventilator (consisting of an ILG Self-Cooled Motor Propeller Fan in a Penthouse with Automatic Shutters) over the drug store, and one 36" ILG Power Roof Ventilator over the grocery store, provide a 2½-minute air change in each store.

ILG Fans in Penthouses on the roof.

Interior of Model Drug Store.

STORES

Interior of Steiden Store.



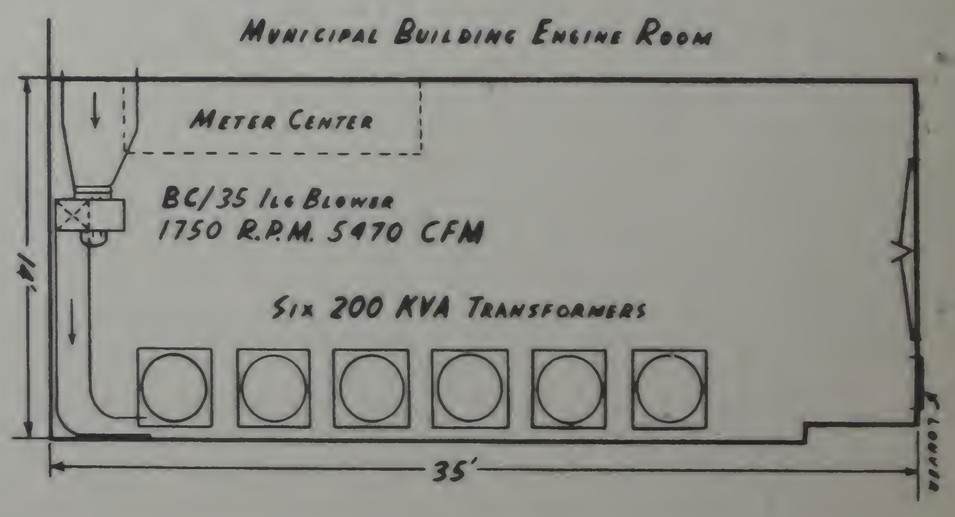
RESULTS: Both stores are effectively air cooled in Summer for increased patronage. Odors, stagnant air, and heat are swiftly removed through ceiling grilles in each store. In Winter the ventilators are used periodically, but less frequently, and at slower speeds, for refreshing air conditions.

(Above) Exterior of beautiful new Houston municipal building.

(Right) Transformer vault in basement of City Hall. Note compact wall mounting of ILG Blower.

PROBLEM: The Houston Lighting and Power Company was responsible for equipping and installing transformer vaults in the new City Hall at Houston, Texas. Ventilation was required for the vault to cool the transformers and to prevent the building up of a high ambient temperature.

SOLUTION: Engineers of the power company developed a chart covering C.F.M. requirements per K.V.A. capacity in transformer vaults, depending upon different incoming air temperature. 95° incoming air was figured for the worst condition, and provision was made to prevent maximum temperature in the vault from exceeding 104°. The six transformers (rated 200 K.V.A., 12,000 volts) required blower capacity to deliver 6 C.F.M. per K.V.A. Chart is based upon 1½% K.W. loss of current flowing through the transformer which goes into heat. An ILG BC-35 Direct-Connected Blower was selected for this service.



RESULTS: Engineers were pleased with this "load limiting" type of blower, where the motor loads remain constant over a large range of air volume and changes in static pressure; the space-saving mounting arrangement on the wall; and the ease of installation.

Exterior of pumping station. Note ILG Fans installed in gables.

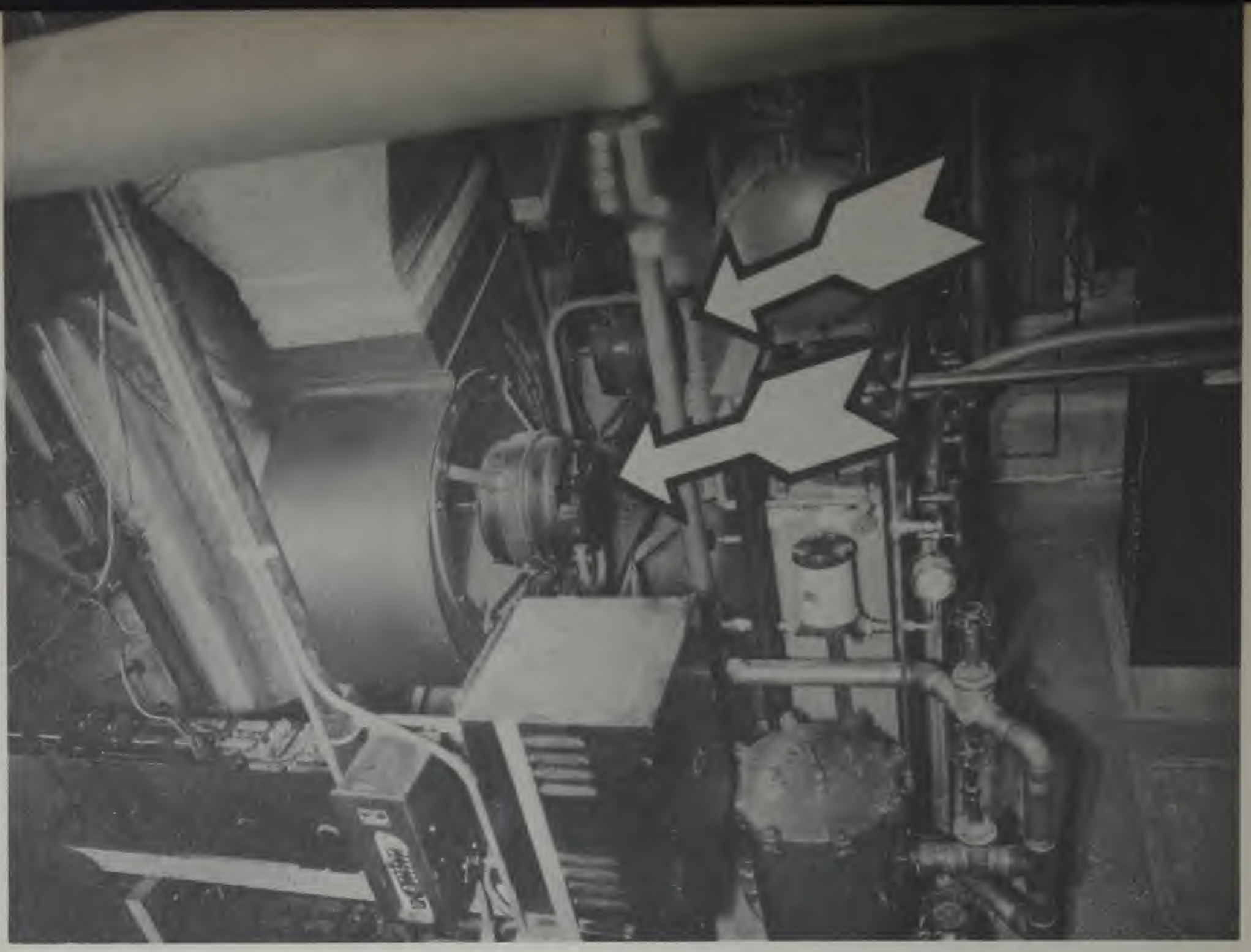
View inside station showing location of one of two ILG Fans.

View of pumping pits where an ILG Blower is located below floor level to supply fresh air.

PROBLEM: In the Nadine Pumping Station of the Pennsylvania Water Company in Pittsburgh, it was necessary to supply fresh air to the men working in the pumping pits, also to remove stagnant air, odors, and heat from the building.

SOLUTION: One BC60 ILG Direct-Connected Blower with variable air controller was installed to supply air to the pits. Two 60" M ILG Self-Cooled Motor Propeller Fans with Automatic Shutters were installed in gables on the roof of the station to provide necessary exhaust.

RESULTS: Operation of the ILG apparatus has justified its selection on the basis of being trouble-free and carrying a "one-name-plate" guarantee.

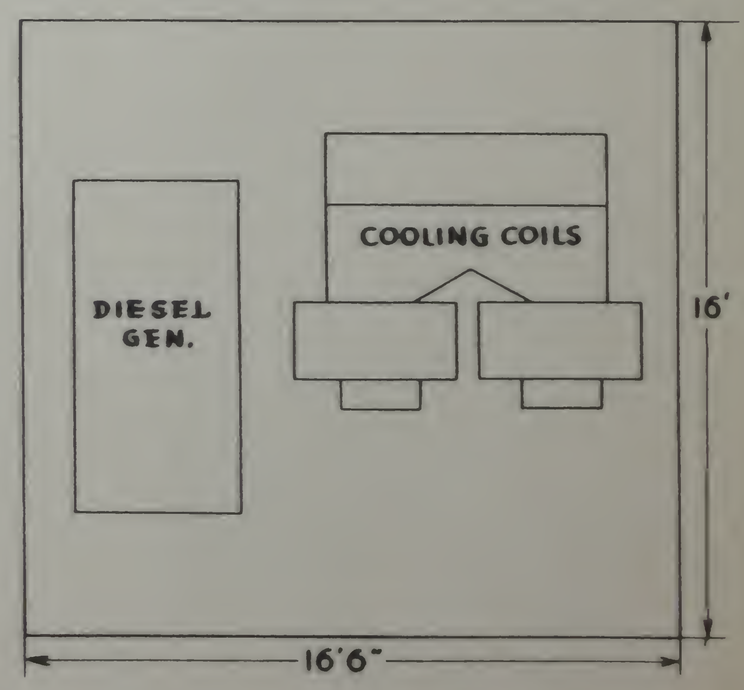


Interior of standby generating plant. Only direct-connection of motor and wheel permits such a compact blower installation.

UTILITIES

PROBLEM: Wartime emergency conditions have necessitated the development of standby generating plants by public utilities, industrial plants, hospitals, and laboratories, for use in the event that bombs, sabotage, or invasion forces disrupt normal power sources. Large diesel direct-connected generating plants require air moving equipment to cool the water from the engine for recirculating.

SOLUTION: In this particular installation, designed by a large telephone company, cooling coils are cased at the inlet side of two ILG Direct-Connected Blowers. Outside air is drawn in over the coils by the blowers to reduce the water temperature for recirculating purposes. Heated, used air is exhausted through ducts leading to roof outlets.



RESULTS: Most standby generating plants are packed into restricted space. Use of ILG Direct-Connected Blowers permits full capacity required in the limited area available.

(Above) Exterior of new sub-station. *(Right)* Interior view indicating openings to Power Roof Ventilators and three of nine ILG Electric Unit Heaters. *(Below)* Roof view showing six of eight Power Roof Ventilators.

PROBLEM: Where wartime demand for more power has been answered by the erection of sub-stations, rapid exhaust of the generated heat is required, plus heating equipment for cold weather requirements. One such new sub-station built in a Southern city, which is the hub of an important industrial section, is illustrated here.

SOLUTION: Six 30" S ILG Power Roof Ventilators provide positive all-weather ventilation and exhaust heat generated by the electrical equipment. Air is changed throughout the entire building every two minutes. To automatically maintain the interior of the structure at a comfortable, healthful temperature, nine ILG Electric Unit Heaters are positioned throughout the building. Note that use of electric heat is particularly logical for an electrical sub-station.

RESULTS: Although wartime restrictions prevent the identification of this company or results obtained, it is obvious that the installation is satisfactory or company executives would not have permitted the photographs to be taken.

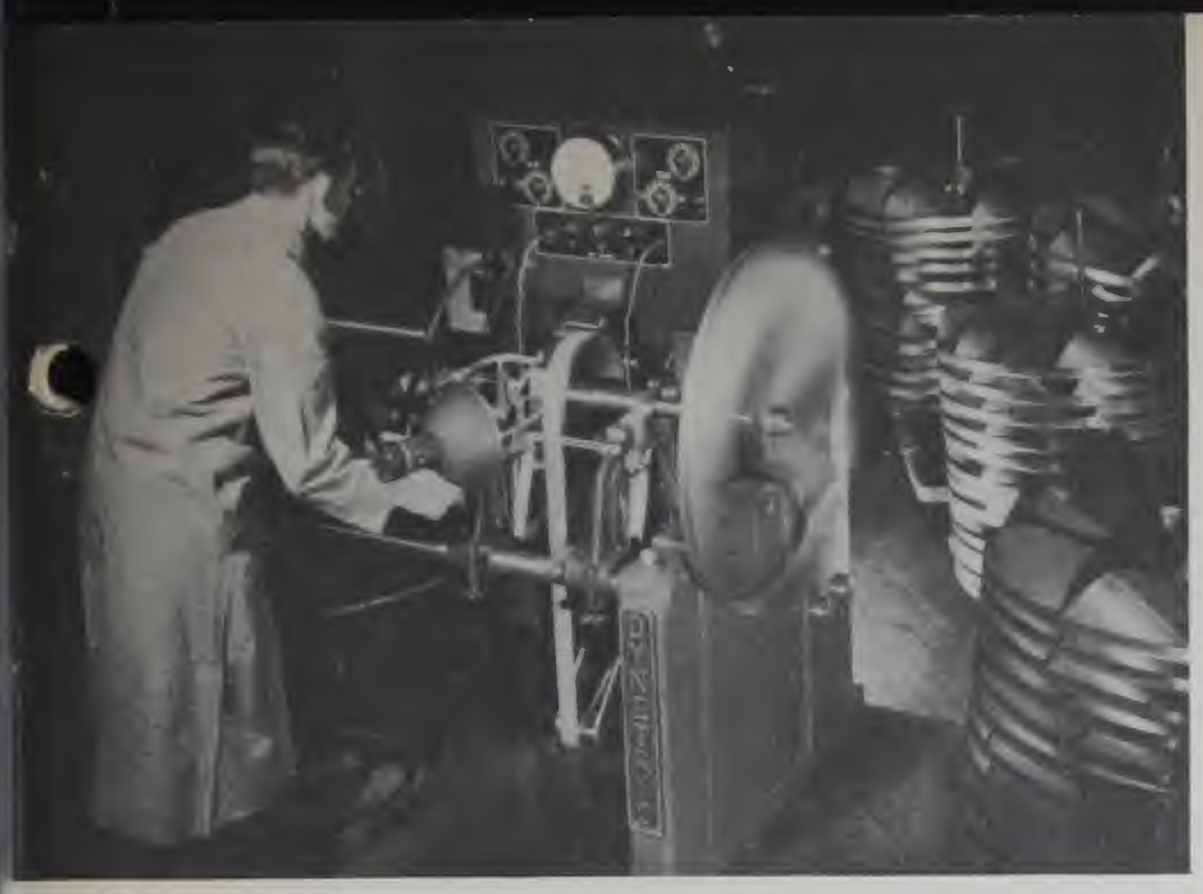
FROM THIS NEW ILG RESEARCH LABORATORY WILL COME AIR CHANGING EQUIPMENT OF TOMORROW

Recognizing the need for research facilities remote from the present plant at 2850 N. Crawford Avenue, Chicago, a new building was constructed in 1943 specifically for laboratory purposes.

Through steady expansion of ILG products and manufacturing capacity, the company outgrew research facilities which formerly were integral with the main plant and thus were subject to production noise and vibration. The new building, of one-story, modern construction, is located immediately west of the main plant. It is specially built to be shake-proof and to a considerable extent sound-proof.

Equipment for the new building includes latest scientific instruments for measuring air, electricity, sound, light, and vibration. Since the building is of vibration-proof construction, extremely sensitive apparatus is installed for sound analysis. Stroboscopic equipment checks deflections while products are in operation. A separate heating plant provides steam and hot water for testing unit heaters.

NOTE: As this book is going to press, the new building pictured above is under construction. The next time you are in the ILG neighborhood, you are invited to stop in and see these new research facilities which are to be used in developing new and better ILG products.

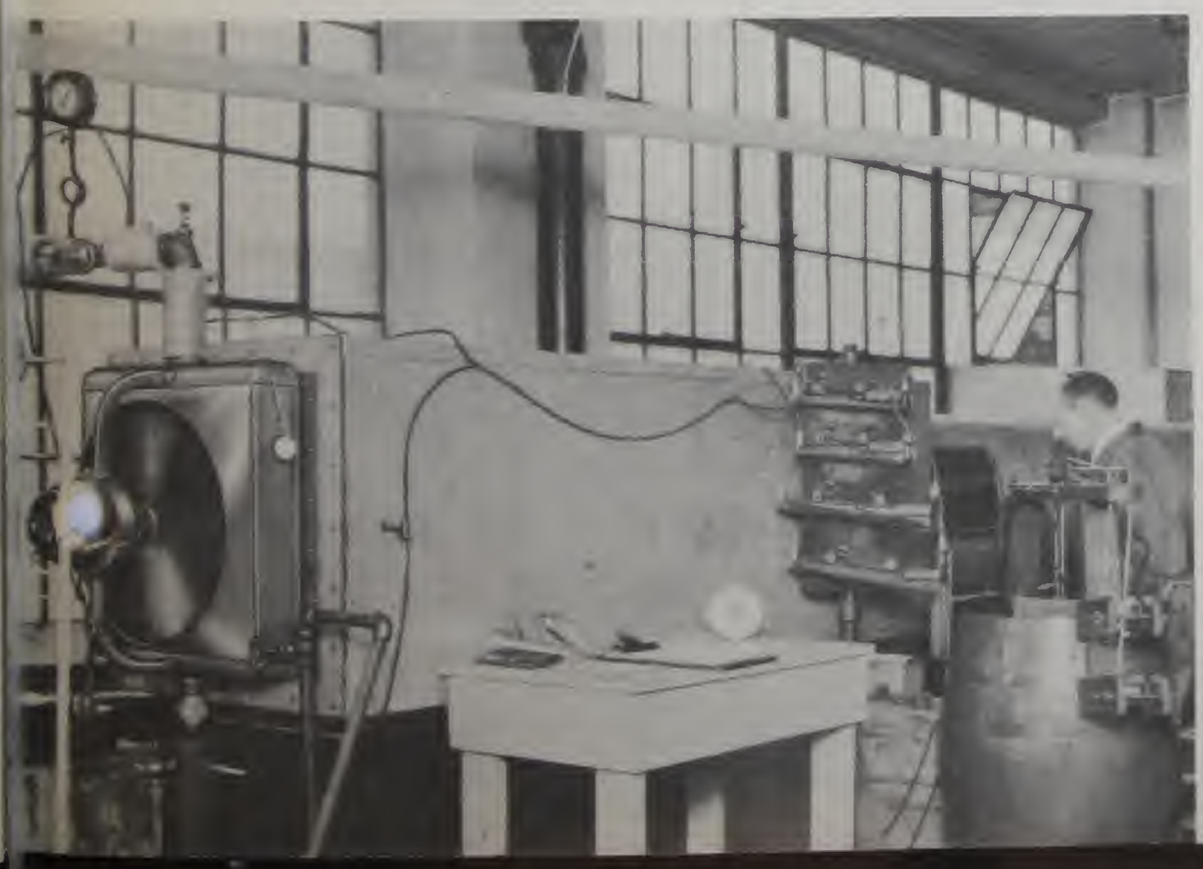


(Above) Every ILG Fan wheel (not every fiftieth or hundredth) must run the gantlet of this exceptionally accurate electrical testing apparatus for determining dynamic balance.

(Above) ILG Fans are rated and certified according to exacting test codes set up by American Society of Heating and Ventilating Engineers and National Association of Fan Manufacturers.

(Above) Testing ILG fans for quietness of operation in the war on noise. *(Below)* Unit heaters are rated and certified according to test codes of the Industrial Unit Heater Association and the American Society of Heating and Ventilating Engineers.

(Above) Every piece of ILG equipment is tested *before* shipment on *exact* current and voltage to be used after installation. *(Below)* Constant research on ILG Direct-Connected Blowers makes possible supremely quiet operation.



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AS IT DID IN 1917, ILG shoulders its full responsibilities during World War II in an effort to keep our fighting forces and war workers efficient and comfortable. Heating, ventilating, and cooling apparatus is being turned out at an ever-increasing rate for ships, bombers, communication trucks — cantonments, bases, schools — for war plants, hospitals, laboratories.... Full details in new, colorful brochure — yours for the asking. Request F. 305.

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